Note 34

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Health Building Note 34

Estate maintenance and works operations

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Estate maintenance and works operations

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About this publication

The Health Building Note series is intended to give advice on the briefing and design implications of departmental policy.

These Notes are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

Health Building Notes are aimed at multi-disciplinary teams engaged in:

- Designing new buildings
- Adapting or extending existing buildings

Throughout the series, particular attention is paid to the relationship between the design of a given department and its subsequent management. Since this equation will have important implications for capital and running costs,alternative solutions are sometimes proposed. The intention is to give the reader informed guidance on which to base design decisions.

Health Building Note 34

HBN 34 focuses on District General Hospital accommodation requirements for:

- Buildings maintenance
- Engineering plant and services maintenance
- Electronic & medical engineering equipment maintenance
- Grounds & gardens maintenance
- Engineering services operation.

Since a District General Hospital is a large, purpose designed complex of buildings containing much specialised, expensive equipment and support services,the timely and effective upkeep of these assets and the efficient operation of supporting services is vital to the cost-effective delivery of health care.

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1.0 Scope of Health Building Note 34

General

1.1 This Health Building Note (HBN) provides guidance on the accommodation required for the maintenance of health care premises and equipment and for the operation of engineering services within a District General Hospital (DGH) site. It replaces Hospital Building Note 34 originally issued in 1973 (and revised in1977). It reflects recent developments in maintenance techniques, statutory requirements and current management arrangements for the provision of maintenance services. The guidance will be useful not only in the planning of new maintenance and operations facilities but also in the rationalisation and upgrading of existing units.

Inclusions

1.2 This Note gives guidance on the design and provision of workshops,together with their supporting storage and office spaces, required to maintain health care premises, equipment and fixtures including the engineering services installations. This group of accommodation is collectively identified as the "works department" in this Note.

1.3 Guidance is now included on the design and provision of workshop facilities required for the servicing of electronic and medical engineering (EME) equipment. This accommodation is identified as the EME workshop in this Note. Guidance is also included for special workshops appropriate for the servicing of audiology, renal dialysis and anaesthetic or other medical gas driven EME equipment.

1.4 Guidance is also given on the provision of accommodation for the maintenance of grounds and gardens.

Exclusions

1.5 Guidance on the provision of workshops suitable for servicing vehicles are excluded from this Note as such facilities will not usually be provided at a DGH. The guidance for vehicle maintenance workshops given in HBN44 – 'Accommodation for ambulance services' (in preparation) – will be relevant to those health authorities contemplating a vehicle maintenance service on a shared district or regional basis.

1.6 HBN6 – 'Radiology department' – includes the provision of workshop accommodation for the maintenance of X-ray equipment. However, paragraph 2.10 of this Note outlines some options on the level of service which might be provided by the EME workshop.

1.7 Guidance on the planning and design of external site features, including the planting of grounds and gardens, together with the revenue consequences of this, is given in HBN45 – 'External works for health buildings' (in preparation).

Works Guidance Index

1.8 This Note contains guidance that is current at the time of publication.Specific issues such as arrangements for dealing with fire, security, energy conservation, etc, are covered by other published guidance which must also be taken into account. Some aspects of the guidance in this Note may from time to time be amended or qualified and it is necessary for project teams to check the current edition of the Works Guidance Index. Because the Index is published by the Department in May each year, and updated in September and January, project teams should ensure that they investigate the possibility of changes not included in the latest published index.

Cost allowances

1.9 The Departmental Cost Allowances associated with this Note are promulgated in an Annex to an Estate Executive Letter issued separately.

Capricode

1.10 Capricode is the mandatory procedural framework governing the inception,planning, processing and control of individual health building schemes. The aim of Capricode is to promote a consistent and streamlined approach to capital development that achieves best use of resources through the selection and construction of relevant and cost-effective schemes that open on time and within budget. It identifies the main activities and provides a framework for delegation with effective management and the proper accounting for expenditure and performance. (See 'Capricode Health Building Procedures' issued with HN(86)32 – in Wales, WHC(86)62.)

Equipment

1.11 Equipment is categorised into four groups, as follows:

Group 1: items (including engineering terminal outlets) supplied and fixed within the terms of the building contract;

Group 2: items which have space and/or building construction and/or engineering service requirements and are fixed within the terms of the building contract but supplied under arrangements separate from the building contract;

Group 3: as Group 2 but supplied and fixed (or placed in position) under arrangements separate from the building contract;

Group 4: items supplied under arrangements separate from the building contract, possibly with storage implications but otherwise having no effect on space or engineering service requirements.

The Equipment Cost Allowance Guide (ECAG) provides a sum of money for the items in groups 2, 3 and 4, related to the sizes of department for which Departmental Cost Allowances are given.

2.0 General service considerations

Introduction

2.1 A District General Hospital (DGH) is a large, purpose-designed complex of buildings containing much specialised, expensive equipment and support services. The timely and efficient upkeep and repair of these assets, in accordance with established estates operational policies, is vital to the cost-effective delivery of health care. Reliability and availability are key issues. Careful consideration must therefore be given to the design and provision of adequate facilities, and to the management arrangements, for undertaking maintenance functions and engineering services operations.

2.2 This Note deals with accommodation for:

a. the works department which provides a service related to the care and maintenance of buildings, grounds and gardens on a hospital site and for the maintenance and operation of engineering plant and services;

b. the electronics and medical engineering (EME) workshop which provides a service related to the wholelife care and repair of electronic and medical equipment used within the hospital.

General operational policy considerations for maintenance

2.3 Maintenance forms a major part of the services provided by both the works department and by the EME workshop. Two important factors influence the manner in which this is organised and the delivery of this service.

2.4 Firstly, maintenance may be organised on the basis of a central facility providing a service to a number of hospitals and/or management units. Alternatively, it may be provided entirely from an on-site unit. Health authorities will therefore need to determine the most appropriate and cost-effective way of organising the maintenance requirements for an individual hospital.

2.5 Secondly, a significant part of the maintenance service can be provided either by a directly employed labour force or by contractors. In practice health authorities will determine, in accordance with their particular circumstances and estate operational policies, the type and proportion of work to be carried out by their own labour force and that which will be let to contractors. Some examples where specialist contractors might need to be engaged by the works department are for the maintenance of lifts, medical gases installations, refrigeration plant and the laying of floor finishes. However, the division of maintenance work can vary within the likely range of:

a. primarily contract work with breakdown repairs only performed by a small direct labour force;

b. primarily direct labour force with peak and specialised work only being performed by contract.

Factors which will influence these operational policy decisions are the availability of labour with appropriate skills and the availability and competitiveness of contract services.

Specific operational policy considerations for EME equipment

2.6 Health authorities will need to assign duties and establish the necessary organisation and procedures for the management and servicing of EME equipment within user departments and throughout the hospital. This will ensure that the right equipment is available when required, in a safe and serviceable condition and at a reasonable, if not minimum, cost. Appropriate guidance on these aspects is contained in HEI No.98; in particular, paragraph 47 outlines the duties of the manager of technical servicing who should be appointed by each health authority to take charge of the overall technical management of "scheduled" and "unscheduled" servicing of EME equipment. *In this Note, these terms when associated with EME equipment have the meanings defined in HEI 98, as follows:*

- *Scheduled servicing - routine checks or tests and maintenance performed on a piece of equipment by a suitably qualified engineer or technician, on a periodic basis.;*

- *Unscheduled servicing - tests or repairs carried out on equipment due to breakdowns or as a result of a problem arising during use.*

2.7 There are advantages if the organisation and management of the functions of an EME workshop is linked with that of the works department, but this is not essential for successful operation.

2.8 It is not appropriate to rely entirely on suppliers or contractors for the servicing of EME equipment, neither is it appropriate for health authorities to either expect or attempt to deal with all EME equipment servicing "in-house". The increasing trend towards microprocessor based equipment dictates a need for highly sophisticated and expensive test equipment well beyond the resources of even the largest EME workshop. Inevitably some servicing will be carried out by contractors who will need access to the workshop facilities provided on site for EME equipment servicing, including those within specific departments described in the next paragraph. Occasionally it may be appropriate or necessary to return some items of EME equipment to manufacturers or suppliers for servicing.

2.9 The ITU and operating theatres, including the abnormal delivery suite of the maternity department, are major users of EME equipment and some servicing will usually be carried out within these departments by a visiting EME technician. This also avoids transportation of delicate equipment and minimises the amount of calibration checks that may be needed. Appropriate facilities will be required within these departments for user servicing and these should be enhanced to provide a safe and suitable environment for an EME technician to undertake minor scheduled and unscheduled servicing. HBN's 26 and 27 and, when updated, HBN21 define an appropriate level of provision for an equipment servicing room. Similar facilities for a visiting EME technician may also be needed in the sterile services department. (See para 2.12.)

2.10 The servicing of X-ray equipment is usually contracted out to equipment suppliers, but there may be financial and other benefits if initial fault-finding and minor repairs are undertaken by technicians operating from the EME workshop; all other work being carried out under a maintenance contract. There may also be a case of all servicing to be done by the EME workshop; contract work being limited to an annual inspection by the equipment manufacturer or supplier. Accommodation for the servicing of fixed and mobile X-ray equipment is more appropriately sited within the Radiology department – see HBN6.

2.11 Both scheduled and unscheduled servicing of some specialised types of EME equipment must be undertaken on a sufficiently large scale in order to be economically viable. Some specialised equipment must be serviced by staff having a certificated standard of competence, (see "Code of Practice" in Appendix 3 of HEI 98) with the consequential operational implications for training and periodic re-certification. The required scale of operation for this specialised type of servicing can be carried out more effectively in specific workshops which are centralised and provide a service to several hospitals. EME equipment falling into this category includes:

a. anaesthetic and other medical gas driven equipment such as patient ventilators. The workload will usually include the servicing and calibration of the medical gas operated equipment used in the operating theatres, ITU, CCU, A and E, maternity department and wards. It may also include the analgesic equipment used by community health care midwives and resuscitation equipment used by the local ambulance service. Servicing of this equipment requires the use of fully trained and certificated technicians only and quality assurance procedures of the highest order. It should only be undertaken "in-house" if these standards can be fully implemented and sustained. This service is usually managed on a day-to-day basis by a supervising technician based in this specialist workshop under the general direction of the manager of technical servicing;

b. audiology equipment employed in clinical procedures as well as that used by the community health care sector for screening purposes. A significant part of this workload is carrying out the acoustic and electro-acoustic calibration to a known degree of precision with traceability of calibration standards. This can be very seasonal, particularly during the school vacation periods when screening equipment used in the community health sector is made available for checking and calibration. This service is usually managed on a day-to-day basis by a supervising technician based in this specialist workshop under the general direction of the manager of technical servicing;

c. Renal dialysis equipment. This should include all dialysis equipment based in patients' homes as well as the range of equipment employed in clinical procedures in the renal unit. It is usually more appropriate if all dialysis equipment servicing is organised by the EME workshop, but undertaken by a specialist workshop facility attached to the renal unit. This would be managed on a day-to-day basis by a supervising technician based in this specialist workshop under the direction of the manager of technical servicing. This work involves technicians having medical laboratory skills in addition to those normally expected of an EME technician. They may also undertake elsewhere the training of patients and/or carers in the use and care of home dialysis equipment.

There are operational advantages in rotating the staff assigned to these specialist workshops so that all EME technicians gain a competent working knowledge of the techniques involved. This should also improve the capability to deal with emergencies out of normal working hours.

Operational policy for decontamination of EME equipment

2.12 Departmental equipment controllers should ensure that EME equipment is appropriately decontaminated prior to scheduled or unscheduled servicing. (See Section 5 and Appendix 5 of HE1 98.) Some items, especially anaesthetic and medical gas driven equipment, will usually be decontaminated in the medical equipment section of the hospital's sterile services department (SSD). This is dealt with more fully in HBN 13 – 'Sterile services department' (in preparation). A visiting EME technician may be needed to dismantle some of these items for disinfection procedures under the supervision of SSD staff. Minor scheduled and unscheduled servicing of this equipment may be carried out here. (See also paragraph 2.9.)

2.13 Facilities will also be needed within the EME workshop to decontaminate by chemical means:

a. items of EME equipment which cannot be decontaminated without dismantling by a suitably qualified engineer or technician;

b. normally inaccessible parts of EME equipment which when exposed during servicing are found, or are suspected, to be contaminated.

Decontamination must be carried out within a suitably equipped cabinet in accordance with established procedures. This cabinet will also provide convenient facilities for the cleaning of EME equipment which is soiled by dust and potentially offensive or noxious particles. The functional and performance requirements of a cabinet suitable for these purposes are described in Appendix 1.

2.14 Equipment decontamination procedures must be in accord with the health authority's written safety policy and all systems of working within the EME workshop and the works department will be governed by this policy; see also HN(87)22 (In Wales, WHC(87)41) and SAB(90)61.

2.15 It is not considered appropriate or economic to provide a decontamination cabinet, as described in para 2.13 above, in a satellite EME workshop (see paragraph 2.35). In this case decontamination and servicing of EME equipment known, or suspected, to be contaminated should be carried out in the off-site parent EME workshop or, if appropriate, in a SSD.

2.16 It is also essential that the operational policies and decontamination procedures effectively embrace all EME equipment which is not dealt with "in-house", but returned to manufacturers or suppliers for servicing or repair. Guidance on this topic is included in Appendix 5 of HEI 98 and HN(87)22. (In Wales, WHC(87)41). This is also highlighted in SAB(90)61 following the failure of some hospitals to implement satisfactory systems of working for such items.

Operational policy for maintenance stores

2.17 The works department will require accommodation for the safe and secure storage of a wide range of materials, consumables, tools and equipment. Some of the materials and consumables will have flammable, corrosive or toxic characteristics and therefore require segregated storage arrangements appropriate for the hazards involved.

2.18 A basic working stock of frequently used engineering materials, spare parts, timber, building materials and maintenance consumables will be required. Stock holding levels should be set at a reasonable minimum consistent with individual rates of use and economic reordering quantities. Materials and replacement parts for maintenance work of a non-recurring nature, or for alterations and additions to existing facilities will usually be ordered as and when required but will need short term storage pending their use after delivery. Many items of engineering and building materials and consumables will be requisitioned from predetermined suppliers against NHS nationally negotiated term contracts.

2.19 Management and accounting procedures will need to be established for all materials used by the works department. Full or part-time storekeeping staff will be needed. Health authorities will therefore need to determine, in accordance with local circumstances and operational policies, appropriate management arrangements for the ordering of works materials and consumables and for the day-to-day control of their receipts and issues. However, the actual storage accommodation should be located as an integral part of the works department irrespective of the management arrangements adopted.

2.20 The extent to which the management and control of works materials and consumables is divested from or shared with supplies management, which is generally responsible for the operation of the hospital receipt and distribution centre, needs to be carefully considered [see also HBN 49 – 'Hospital receipt and distribution centre' (in preparation)]. It is unlikely that identical management arrangements will be appropriate for all commodities and therefore each category needs to be considered in the light of its own characteristics and local circumstances.

The following is an example of management arrangements for the range of materials usually used by the works department. This is not intended to be a recommendation, but illustrates how the ordering and issue of the wide variety of items might be organised and controlled:

a. works stock items and consumables. These are ordered by the storekeeper, via the supplies officer, to predetermined maximum and minimum stock levels agreed with the unit works manager and delivered to the works stores. They are issued by the storekeeper to works staff against job requisitions authorised by a works officer;

b. special items of equipment or spares, including new or replacement plant. These are ordered by a works officer and delivered to the works stores (storekeeper having a copy of the order). They will be retained in the store until collected by works staff against a job requisition authorised by a works officer;

c. building materials. These are ordered by a works officer, delivered to the external storage compound, and issues are controlled by works staff;

d. timber. This is ordered by a works officer as required. Deliveries and issues are controlled by the foreman/chargehand joiner responsible to a works officer;

e. paint. This is ordered by a works officer as required and delivered to the works store (with flammable paints and solvents segregated into the flammable liquids store). It is issued by the storekeeper to works staff against job requisitions authorised by a works officer. A selection of paints in regular demand may also be treated as stock items for routine reordering by the storekeeper, via the supplies officer, against predetermined maximum and minimum stock levels. Small amounts of paint already booked out, but not fully used will be retained in the paint shop under the foreman's/chargehand's control;

f. road salt and grit. This is ordered by a works officer as required, delivered to the storage area and becomes consumable on delivery;

g. garden plantings, gardening equipment, fertilisers and chemicals. These are ordered by a works officer as required. Deliveries, storage and issues are controlled by the head gardener responsible to a works officer;

h. emergency equipment store items. These are held on the works manager's inventory and replacements are ordered, as required, by a works officer.

2.21 The EME workshop will require accommodation for the safe and secure storage of a wide range of discrete electronic and mechanical components, modules, special tools and test equipment. It is appropriate that these should be accommodated within the EME workshop and that their ordering and the day-to-day control of receipts and issues be the responsibility of the manager of technical servicing.

Service objectives for the works department

2.22 The main functions of the works department, in accordance with local estate operational policies, will usually include:

a. dealing with day-to-day requests for minor repairs to non-medical equipment, furniture and fittings, building fabric and low cost alterations;

b. dealing with breakdown repairs, ie failure of basic services such as boilers, engineering services distribution, drain blockages and roof leaks;

c. attending to equipment breakdown, ie failure of engineering equipment and services in user departments;

d. operation of a planned preventive maintenance system for the whole estate, ie. – the building fabric (including external painting and internal redecorations), engineering plant, grounds and gardens;

e. control and operation of the engineering systems and services, including the promotion of energy efficiency;

f. ensuring compliance with statutory and safety requirements such as periodic examination of plant and equipment, and hazard notices;

g. maintaining the asset, technical and statutory registers;

h. alterations to the estate and engineering services, for example, planned upgrading of services or changes in layout of buildings, grounds, etc;

j. the monitoring and supervision of engineering and building contractors.

Service objectives for the EME workshop

2.23 The work carried out by the EME workshop will be determined to a large extent by local operational and EME equipment management policies. In general, the main functions will usually include:

a. advising on the selection of new or replacement

EME equipment including the evaluation of documentation and/or a sample prior to purchase;

b. taking delivery of new EME equipment for pre-installation acceptance testing to ensure compliance with the appropriate safety and performance standards, in accordance with HEI 95;

c. maintaining EME equipment asset registers and adequate records of service history, including retention of statutory records;

d. performing and/or arranging user training;

e. operating a system for the scheduled servicing of EME equipment, including the monitoring of maintenance contracts;

f. investigating incidents arising out of alleged EME equipment malfunction;

g. performing unscheduled servicing of EME equipment as and when required;

h. arranging formal disposal and replacement when EME equipment reaches the end of its useful or economic life-span.

Scale of provision

General

2.24 Workshops and supporting accommodation will be required regardless of whether direct labour or contractors are carrying out maintenance. On-site maintenance workshop facilities will also be needed even when the service is not organised on a local basis. Provision of suitable accommodation within the hospital estate is necessary to prevent hazardous situations arising during maintenance operations and also to avoid the proliferation of contractors temporary buildings and workshop equipment.

Works department workshops

2.25 Experience has indicated that the overall level of demand for the maintenance services provided by a works department can be related to the number of beds in the hospital.

2.26 However, the scale of workshop accommodation for works maintenance is determined primarily by the range of trades for which facilities have to be provided, viz electricians, fitters, plumbers, etc. The size of an individual workshop is influenced only to a limited extent by the number of tradesmen or technicians engaged in that particular trade or type of work because a high proportion of building and engineering maintenance work has to be done in-situ.

2.27 If a significant part of the demand for works maintenance services is to be met by contractors, some reduction to the workshop areas recommended for specific trades can possibly be made. Contractors will be expected to carry out some repairs and an element of fabrication off-site.

2.28 The accommodation needed for grounds and gardens maintenance is comparatively small. Its essential functional space requirements are a storage compound for road salt and grit, storage accommodation for agricultural machinery and chemicals plus possibly a propagating greenhouse. Whether or not such accommodation needs to be provided will be determined primarily by the character and extent of the site and the consequential estate operational policies. The size of this accommodation is not greatly influenced by either the site area or the size and function of the hospital.

EME workshops

2.29 Originally the basis for planning the service provided by, and the staffing levels for, an EME workshop was the number of acute beds. This could result in possible over-manning at large DGHs and under-manning at small DGHs. The approach now recommended is to consider viable sizes of EME workshops and their workload capabilities related to both a range of acute beds and the proportion of EME equipment maintenance undertaken "in-house". Consideration also needs to be given to the necessity for in-house training of EME technicians to meet the needs of the NHS, since trained staff in sufficient numbers cannot readily be recruited from elsewhere. This factor dictates a minimum size of EME workshop in which such training can be undertaken properly.

2.30 The ratio of in-house to contract servicing also has a bearing on the number of EME technicians to be employed and must be carefully assessed. Health authorities will need to determine this to suit their own requirements and operational policies. It is unlikely that the amount of EME equipment servicing undertaken in-house will exceed 75% of the total workload for the reasons explained in paragraph 2.8.

2.31 The overall size of an EME workshop is influenced only to a limited extent by the number of technicians employed. This is because the only variable is the number of workstations in the electronic servicing area and these occupy a relatively small proportion of the total space needed for an EME workshop. Due to the nature of EME equipment servicing and the safety procedures necessary for "live" working practices during the repair and testing of EME equipment, it is essential that an individual workstation be provided for each EME technican or trainee. Facilities for mechanical servicing/dusty procedures also have to be provided although they are unlikely to be in continuous use in the smaller sizes of EME workshop.

2.32 The smallest viable size of EME workshop is considered to be one which provides two workstations in the electronic servicing area. The technicians employed in this size of EME workshop would usually have the necessary skills to undertake also any mechanical servicing tasks in the mechanical servicing/dusty procedures area. In larger EME workshops, the latter space would most likely be used by a technician whose skills are predominantly those associated with precision mechanical (instrument) maintenance.

2.33 An EME workshop with three electronic workstations is probably the smallest size within which training can effectively be provided and for which an additional electronic workstation will be required.

2.34 This Note provides guidance for three basic sizes of EME workshops and the following table illustrates their service capabilities:

Number of electronic workstations	Number of trainee workstations	Servicing capability of EME workshop	
		75% of workload done "in-house"	50% of workload done "in-house"
2	0	up to 350 acute beds	up to 650 acute beds
3	1	up to 650 acute beds	up to 650 acute beds
4	1	up to 950 acute beds	over to 950 acute beds

2.35 A satellite EME workshop will be needed at any hospital site that obtains its EME equipment servicing from offsite facilities. This accommodation will enable health and safety requirements to be met regardless of whether servicing is provided by visiting NHS staff or contractors. It provides workstations for two technicians, a limited amount of storage space and other minimal facilities. It is suitable for carrying out a limited range of scheduled and unscheduled servicing only. It is **not** suitable as the permanent base from which a full range of EME equipment servicing can be provided, nor is it suitable for dealing with contaminated, or potentially contaminated, EME equipment. (See paragraphs 2.12 to 2.15.) This accommodation will usually be under the control of the hospital's manager of technical servicing, who would grant the use of the facilities, under agreed procedures, to visiting EME technicians to enable them to carry out their duties in a safe environment.

Functional units

2.36 The functional unit for the works department is a range of the number of beds in the DGH. This Note provides guidance for three sizes of works department suitable for DGHs of 250–349, 350–649 and over 650 beds. In addition, guidance is provided for single sizes of optional accommodation for the maintenance of grounds and gardens.

2.37 The functional unit for the EME workshop is the number of technician workstations in the electronic servicing area. This Note provides guidance for EME workshops having 2, 3 and 4 electronic workstations and how to relate their EME equipment servicing capability to a range of the number of hospital acute beds, after taking account of the ratio of in-house to contract EME equipment servicing. Guidance is also provided for the additional space needed for the workstation for a trainee EME technician.

2.38 In addition, guidance is provided for:

a. a single size of satellite EME workshop suitable for smaller hospital sites where EME equipment servicing is undertaken by visiting technicians;

b. single sizes of special workshops for the servicing of specific types of EME equipment. These are:

(i) anaesthetic equipment workshop. This is suitable for the workload generated by the anaesthetic equipment associated with approximately 1400 acute beds;

(ii) audiology equipment workshop. This is suitable for the workload generated by approximately 600–700 items of audiology equipment, of which approximately 70%–80% is community based;

(iii) renal dialysis equipment workshop. This is suitable for the workload generated by a total of approximately 50 dialysis machines, being a mixture of clinical departmental equipment and home based units.

These special workshops will be annexed to other accommodation from which they will derive all primary services, sanitary facilities and other supporting functional requirements.

3.0 General function and design requirements

Introduction

3.1 This Chapter provides general guidance, based on the service objectives outlined in Chapter 2, which should be taken into account when designing maintenance departments.

Location of maintenance departments

3.2 The works department maintenance workshops will need ground floor external vehicular access and access to hospital corridors. Maintenance workshops are likely to be noisy and should preferably be sited in an industrial zone which is substantially separated from the wards and clinical departments.

3.3 The location of the EME workshop should allow convenient access to and from the major user departments, with particular regard to transportation and reception of bulky equipment. It should not be too close to the works department maintenance workshops and should not be sited adjacent to main electrical substations, welding workshops or the physiotherapy department (where medical diathermy equipment may cause substantial electromagnetic interference).

3.4 The location of accommodation related to the maintenance of grounds and gardens will be influenced by the general layout of the site and its road network and the extent to which some of it can be integrated with the works department.

General features of a works department

3.5 Care needs to be taken in the layout of this department to take into account noise, dirt and fumes, the relationship of trade workshops to each other and to the works managerial offices. Where flexible craft working practices are employed some trade workshops, such as plumbers and fitters, can be combined.

3.6 The subdivision of the total workshops accommodation will depend on local arrangements and should be carried out using building components which can readily be altered to accommodate future changes in use or working practices.

3.7 Where items such as pipes and timber are stored or manipulated the minimum size of the accommodation has to be suitable for manoeuvring standard stock lengths.

3.8 Trade workshop areas should have a clear height of 3.3m; offices, stores and similar areas need not exceed 2.7m. Workshop areas, as well as offices, should have natural lighting and ventilation; mechanical ventilation will be needed for specific activities.

Accommodation requirements of a works department

3.9 Workshop accommodation should be provided for each of the various trades, viz electricians, fitters/plumbers, joiners, painters and bricklayers/ plasterers.

workshop facilities will also be needed for:

a. degreasing;

b. welding;

c. occasional cleansing of equipment contaminated with body fluids.

3.10 Accommodation will be required for the safe storage of:

a. consumables and spare parts;

b. portable tools and equipment;

c. faulty and repaired equipment;

d. timber and sheet materials;

e. access equipment;

f. emergency equipment;

g. building materials;

h. scrap materials;

j. machinery and equipment for grounds and gardens maintenance;

k. garden chemicals and fertilisers;

m. flammable liquids;

n. industrial gas cylinders;

p. corrosive liquids;

q. glass.

Other hospital departments may also require storage facilities for items (m), (n) and (p). These may be combined with those for the works department, which is usually the principal user.

3.11 Office accommodation will be required for:

a. works manager;

b. building and engineering managers;

c. planner/estimator;

d. technical supervisors;

e. clerical support;

f. computer based operational monitoring and management information systems.

3.12 Supporting amenity accommodation will be required for:

a. messroom, toilets, changing and showers primarily for works operatives;

b. timeclocks/records for hourly paid maintenance staff;

c. cleaners' room.

3.13 Accommodation may be required for:

a. the garaging of vehicles based at a particular site;

b. the charging of battery electric vehicles used for internal transport.

Information systems for works operations and maintenance management

3.14 In order to operate efficiently, the works department will need monitoring systems giving managers and craftsmen information on equipment status and key operating conditions. Such systems will usually include the alarms for the engineering plant and the engineering services distribution networks serving the hospital.

3.15 Maintenance management will also need to operate a Labour Management System, the Works Information Management System (WIMS) and an Energy Management System to ensure efficient utilisation of facilities and resources. The WIMS will usually include the asset registers for the premises and these will need updating when replacements or removals are made or new facilities are introduced. Some data from these works information systems will usually have to be transferred into the hospital general management data systems in accordance with local information policies.

3.16 Information technology has, therefore, a central role in estate maintenance and works operations management. The use of computer systems – and indeed the rate of technological innovation – continues to increase. The implications for building project teams are threefold: firstly, the provision of suitable accommodation for the computer(s), printers, visual display terminals, modems and other related items; secondly, a requirement for the provision of wireways for data transmission cabling; and thirdly, the adequacy of power supplies. Due consideration should be given to these factors so that new equipment can be introduced easily and quickly at some later date.

3.17 Two other aspects need to be taken into account: ambient lighting and noise. The quality of ambient lighting in areas where visual display terminals are used can affect legibility of the text on the screen. (See also paragraph 7.61.) Some types of printers and plotters can be noisy in operation and may need to be sited away from workstations.

3.18 Computing expertise is now widely available in the NHS and project teams should ensure, at an early stage, that they are aware of current local computing policies and future plans so that their proposals conform with them and the selected equipment is compatible.

Accommodation requirements for grounds and gardens maintenance

3.19 Consideration should be given to providing a secure covered store for equipment and machinery used in grounds and garden maintenance. This would normally be needed when directly employed labour is used for this function. It could also be provided when grounds and garden maintenance is contracted out as its availability may be reflected in the overall contract price.

3.20 If local operational policies allow annual planting, and certain types of plants are to be stored, a greenhouse may be required by the gardening staff for this purpose. The location needs to be on flat, level ground offering some security from any likely vandalism and shelter from winds.

3.21 Most sites have a requirement to store road salting and gritting materials. Quantities used will depend upon the area of roads, paths and car parks to be covered in inclement weather and the seasonal variations.

Accommodation requirements of an EME workshop

3.22 The work carried out in the EME workshop will depend on local needs. Generally accommodation should be provided for:

a. undertaking pre-installation acceptance checks for new items of EME equipment;

b. the servicing of electronic and mechanical equipment in separate areas of the workshop in order to segregate machining, grinding, filing and similar dusty procedures which are inappropriate in the relatively clean environment required for servicing electronic equipment;

c. dismantling, decontamination and cleaning of equipment which may be contaminated internally with body fluids or tissue. The dismantling and decontamination operations must be undertaken in a cabinet specially designed and equipped for this purpose;

d. carrying out associated administrative and clerical duties in suitably equipped office accommodation.

3.23 Machine shop facilites will be required within the mechanical/dusty procedures area for the repair of surgical instruments and the manufacture or modification of specialised mechanical parts not readily available from equipment suppliers. However, suitable precision machine tools may already be available in a nearby works department and this should be taken into account when determining the appropriate scale of provision.

3.24 Some of the workload of the EME workshop will be undertaken within designated clinical or service departments (see paragraph 2.9). Each of these designated departments should have an appropriate workstation suitably equipped with piped medical gases terminals and safety protected electrical supplies.

3.25 The EME workshop will be the centre for the storage of EME equipment servicing manuals, drawings, diagrams and test records. Unless it is closely integrated with the works department management systems, it will also retain the EME equipment asset register, the service history records and the documents associated with the system for scheduled servicing. User manuals should be stored in the relevant user department, as appropriate.

3.26 Personal hygiene is essential for technicians who will be working on equipment which may be, or may have been, in service in any of the wide variety of hospital environments from catering to clinical and pathological. Nothing other than hand washing should be carried out in wash-hand basins and no food should be consumed within the EME workshop.

Accommodation requirements of a satellite EME workshop

3.27 This accommodation should be suitable for:

a. undertaking pre-installation acceptance checks for new items of EME equipment;

b. undertaking limited scheduled servicing in accordance with pre-planned programmes or contract terms;

c. undertaking limited unscheduled servicing;

d. carrying out disposal procedures in accordance with local operational policies.

3.28 Although it is unlikely that more than one visiting manufacturer's technician will be on site at any one time, it is quite likely that a district based EME workshop would send more than one technician to carry out scheduled servicing procedures. For planning purposes therefore provision should be made for intermittent use by two technicians visiting simultaneously.

Accommodation requirements of the anaesthetic equipment workshop

3.29 This accommodation should be suitable for:

a. undertaking pre-installation acceptance checks for new items of anaesthetic equipment;

b. undertaking scheduled and unscheduled servicing;

c. carrying out disposal procedures in accordance with local operational policies;

d. carrying out associated administrative duties at a suitably equipped office workstation;

e. maintaining stocks of specialist and standard components, spares and test equipment;

f. storing selected equipment service manuals and records, in conjunction with the parent EME workshop.

3.30 In order to provide a viable facility it is considered that provision should be made for one supervising and three other technicians.

Accommodation requirements of the audiology equipment workshop

3.31 This accommodation should be suitable for:

a. undertaking acceptance checks and initial calibration of new items of equipment;

b. undertaking scheduled and unscheduled calibration checks, and servicing;

c. carrying out disposal procedures in accordance with local operational policies;

d. carrying out associated administrative duties at a suitably equipped office workstation;

e. maintaining stocks of specialist and standard components, spares and test equipment;

f. storing selected equipment service manuals and records, in conjunction with the parent EME workshop.

3.32 In order to provide a viable facility it is considered that provision should be made for one supervising and one other technician.

Accommodation requirements of the renal dialysis equipment workshop

3.33 This accommodation should be suitable for:

a. the routine clinical servicing after each patient treatment, (ie strip, decontaminate, sterilise, rebuild with replacement disposables and test/calibrate for re-use);

b. undertaking scheduled and unscheduled equipment servicing;

c. carrying out disposal procedures in accordance with local operational policies;

d. carrying out associated administrative duties at a suitably equipped office workstation;

e. maintaining stocks of specialist and standard components, spares and test equipment;

f. in conjunction with the renal unit manager, maintaining bulk stocks of machine specific and other disposables for clinical servicing;

g. storing selected equipment service manuals and records, in conjunction with the parent EME workshop.

3.34 For planning purposes it is considered that provision should be made for one supervising and two other technicians, one of whom will usually be involved in the scheduled servicing of dialysis machines based in patients' homes.

Specific statutory provisions

3.35 Workshops are defined as "factories" by The Factories Act 1961 and compliance with this legislation and associated Health & Safety legislation is mandatory.

3.36 Provision should be made in all workshops for the relevant statutory display of extracts of the Factories Act and applicable Regulations, together with notices on first aid, treatment of electric shock, etc.

3.37 The provision and stocking of first aid boxes should be appropriate for the workshop and maintenance tasks being undertaken; eye wash bottles and accessories should be available at the locations where corrosive or flammable liquids are stored or dispensed.

3.38 A wide variety of materials, such as cleaning fluids, adhesives and garden chemicals, that are used during maintenance operations are potentially hazardous to health and are therefore subject to the Control of Substances Hazardous to Health Regulations, 1988 (COSHH). Detailed guidance on assessing these risks in hospitals was issued to health authorities under cover of EL(89)MB/185; further copies of the guidance publication are available from HMSO.

Fire safety

3.39 Workshops and stores are classified in 'Firecode' as high fire-risk areas and some workshop operations, for example, welding , are classified as special risks. Therefore particular attention should be paid to the recommendations for fire protection contained in 'Firecode', and also to the requirements for the provision of means of escape in case of fire for those persons working in maintenance workshops.

4.0 Specific functional and design requirements of a works department

Introduction

4.1 This Chapter describes the workshops, offices, stores and supporting accommodation which together will be required to fulfill the general functional requirements of a works department described in Chapter 3.

WORKS DEPARTMENT MAINTENANCE WORKSHOPS

Electricians' workshop

4.2 This workshop is required as a base for all electricians, (technician, craftsmen and assistant grades) employed in the maintenance, operation, modification and repair of all electrical plant, equipment and services.

4.3 The space allocated should be sufficient to allow servicing and repair of such equipment as electric motors, ventilation plant, heated food trolleys, domestic appliances, catering equipment, battery operated electric vehicles, light fittings, nurse call and alarm systems, any of which may be transported to the workshop.

4.4 This workshop needs to be equipped with inlaid vinyl top work-benches, with lockable drawers beneath, at suitable working height. Non-conductive floor mats should be provided at each work-bench.

4.5 The floor area can be divided by either physical barriers or bench relationships to achieve a degree of separation between different types of activities, for example, instrument and controls equipment repair, dirty and clean work.

4.6 A space for leaving equipment on test is also needed and this may require physical barriers to protect persons and restrict entry whilst testing is occurring.

4.7 Fixed tools and equipment should include:

a. drilling machine;

b. heavy duty battery charger;

c. degreasing facility;

d. bench vices.

Services should include multi-socket and voltage outlets for test purposes and a compressed air supply.

4.8 An area should be delineated for battery charging which should be provided with a lead-lined bench, Belfast sink and cold water supply. The bench should have a fume collection hood above it which should incorporate mechanical extract ventilation. All materials and components should be suitable for use with chemically agressive and flammable vapours. A low level fresh air inlet should be adjacent.

4.9 The layout of the workshop should provide a clear space for the largest physical object to be worked upon safely and should be sufficient in length to allow metal and plastic conduits up to 6 metres long to be manoeuvred. The position and size of entry doors should also reflect these considerations.

4.10 An area should be provided to hold plant and equipment removed from position and awaiting repair and repaired plant and equipment awaiting return to their original location.

Fitters'/plumbers' workshop

4.11 This workshop is required as a base for all fitters and plumbers (technician, craftsmen and assistant grades) employed in the operation, maintenance, modification and repair of all mechanical engineering and plumbing services and equipment.

4.12 The space should be sufficient to allow servicing and repair in the workshop of such equipment as hospital beds, ward pulp macerators, kitchen equipment, laundry equipment, heating equipment, domestic hot water equipment and other mechanical and plumbing plant removed to the workshop for servicing and repair.

4.13 This workshop should be equipped with work-benches, with lockable drawers beneath, at a suitable working height. The space can be divided by either physical barriers or bench relationship to achieve a degree of separation between different types of activities, ie fitting, plumbing, welding, lubrication, etc.

4.14 A designated area should be identified for welding processes. This will require a bench, constructed from steel, and suitable screening to contain ultra-violet radiation and high intensity light levels during welding and cutting operations. Local mechanical exhaust ventilation

capable of diverting welding fumes away from the operative's breathing zone should also be provided. There should be sufficient space to accommodation both gas and electric welding equipment adjacent to the welding bench.

4.15 Fixed tools and equipment should include:

a. drilling machine;

b. grinding machine;

c. centre lathe;

d. power hacksaw;

e. overhead lifting beam of 1 tonne rated capacity;

f. degreasing facility,

g. suitable compressed air supply;

h. bench vices;

j. a Belfast sink with hot and cold water supplies.

4.16 The layout of the workshop should provide a clear space to allow the largest physical object to be worked upon safely and should be of sufficient length to allow pipes up to 6 metres long to be manoeuvred for cutting and fabrication purposes. There may be a need to consider pipe access from outside for cutting and threading purposes. The position and size of entry doors should also reflect these considerations.

4.17 An area should be provided to hold plant and equipment removed from position and awaiting repair and repaired plant and equipment awaiting return to their original location.

Joiners' workshop

4.18 This workshop is required as a base for all joiners employed in the maintenance, repair and manufacture of all building components, furniture and equipment.

4.19 The space should be sufficient to allow repair, manufacture and refurbishment in the workshop of such items as doors, furniture, locks, wall fixtures and other fittings having a predominantly wood construction. Requirements for upholstery repair may need to be considered. There should be sufficient clear space to allow the largest object likely to require maintenance to be worked upon safely.

4.20 This workshop should be equipped with work-benches fitted with bench wood vices, with lockable drawers beneath, at suitable working heights. A Belfast sink with hot and cold water supplies should also be provided. The space can be divided by either physical barriers or bench relationship to achieve a degree of separation between different types of activities, ie upholstery, use of adhesives, key cutting, polishing and finishing, etc.

4.21 A designated area should be identified for glue and adhesive use. This will require a metal bin or cupboard for the local storage of flammable materials and other secure storage for materials subject to The Control of Substances Hazardous to Health (COSHH) Regulations. It may also need to be equipped with a fresh air inlet and mechanical extract ventilation suitable for use with flammable vapours.

4.22 An area should be provided to hold items removed from position and awaiting repair and repaired items awaiting return to their original location.

4.23 Permanently fixed woodworking machine tools and equipment should be located in a separate designated area. The space should be sufficient for the safe machining of materials and piece parts prior to their assembly or bench finishing. Although this area is part of the joiners' workshop, physical barriers should exist between the areas of bench work and machine work.

4.24 The woodworking machine tools should include:

a. circular saw;

b. planing and thicknessing machine;

c. morticing machine;

d. drilling machine.

All the above machines should be connected to a suitable wood chip and dust extraction system. The chip and dust receiver may be located outside the joiners' shop, but the need for, and routing of, inter-connecting ducting to the machinery inside requires careful consideration when determining its location. The aim should be to minimise overall system length and the number of bends whilst providing an appropriate minimum radius at all changes of direction or level.

4.25 The layout of the machinery area must provide sufficient space for safe working at each machine and also permit each machine to accept timber up to 6 metres length and sheet material up to 3 x 1.8 metres in size. The position and size of entry doors should also reflect these considerations.

Painters' workshop

4.26 This workshop is required as a base for all directly employed painters and decorators undertaking the maintenance of the hospital and related buildings. If painters and decorators are not directly employed, a space identified to this function may still be desirable to provide a site base for contractors in preference to temporary site-hutted accommodation.

4.27 The space allocated should be sufficient to allow painting and refurbishment of removable items of furniture and equipment to be undertaken here. It should also be sufficient to allow secure storage of materials in use and the basic tools and equipment required by a painter. These will include brushes, fillers, cleaning fluids, dust sheets, abrasives and secure trolley transporters for conveying these items and other materials to painting locations. The provision of a booth and associated mechanical ventilation system for undertaking spray painting processes is not considered to be justifiable at individual hospital sites.

4.28 An area should be provided to hold items removed from position and awaiting repainting and repainted items awaiting return to their original location.

4.29 This workshop should be equipped with work-benches, with cleanable tops having lockable drawers beneath, plus shelving for storage purposes. A Belfast sink with hot and cold water supplies should be also be included. Particular attention should be paid to ensure adequate ventilation to remove paint smells and fumes during brush cleaning and paint dispensing/mixing.

4.30 The layout of this workshop should provide sufficient clear space to allow the largest physical object to be worked upon and should be of sufficient length to accommodate items up to 4 metres in length. The position and size of entry doors should also reflect these considerations.

Bricklayers'/plasterers' workshop

4.31 This workshop is required as a base for all workmen employed to carry out maintenance and repair to the exterior/interior structure of buildings and the site drainage systems. Their duties may also include an element of small new works.

4.32 The preparation of materials (for example, cements and plasters), as part of work elsewhere on the hospital site may be undertaken here. The workshop may provide a suitable place for the storage of consumables in relation to this trade, such as cement and plaster powders, agents, ballast, etc. For this reason the area requires to be dry and frost-proof.

4.33 Portable equipment required to be based here may include cement mixer, barrows, drain cleaning apparatus and other hand tools. The workshop should be equipped with a cold water supply and Belfast sink. The position and size of entry doors should allow entry/exit by a normal workman's barrow.

WORKS DEPARTMENT STORES

Internal materials and equipment store

4.34 This store is required as the base for receiving, safekeeping and issuing the following types of materials, spares and equipment:

a. stock item spare parts and materials;

b. maintenance consumables;

c. specialist spare parts and materials required for work of an intermittent nature;

d. portable tools;

e. lifting appliances;

f. specialist testing and other equipment.

4.35 This store should be equipped with the following fixtures:

a. serving counter to form physical barrier to entry, but allowing the issue of materials, tools and equipment to authorised persons;

b. adjustable steel shelving in sufficient quantity to allow items to be stored in an orderly manner and allow ease of retrieval;

c. stacking type storage bins to allow storage of smaller or loose items and to maximise shelf space;

d. fixed horizontal racking for tubular items up to 6 metres in length, for example, pipe and conduit;

e. fixed dividers to permit safe vertical storage of sheet materials up to 2.5 X 1.2 metres;

f. fixed wall racking and brackets for items which require to be hung, for example, drive belts, ropes and coils of flexible pipe.

4.36 The internal layout of the store and the location of its fixtures and entrances will need to provide sufficient space for the safe manoeuvring of the tubular items up to 6 metres in length and the sheet materials up to 2.5 x 1.2 metres during both initial delivery and subsequent issues.

4.37 The location of the store should allow ease of access from the craft workshops and to outside agencies making deliveries of goods.

4.38 Hand washing facilities should be provided for immediate use by the storekeeper.

4.39 An enclosure within, or adjacent to, the store will be required for clerical duties. This should be situated as near to the serving counter as possible and should be equipped with a desk, chair and cabinets sufficient to store records on the movement of goods and materials. There may also need to be a computer terminal, either here or at the serving counter, to assist stock control. This may either stand alone or be linked to other computer systems to suit local data processing practices.

4.40 The value of the stores stock will be determined by local policies, but it is desirable to provide automatic intruder alarm protection for the stores. In addition, the accommodation should be fitted with dedicated security locks to all entrance doors; the custody of keys and access out of normal working hours being matters to be determined locally.

Timber and sheet materials store

4.41 Part of this store should be equipped with racking to allow for horizontal storage of sections of timber up to an overall length of 6 metres. A further part should be equipped with dividers to allow safe vertical storage of sheet materials up to 3 x 1.8 metres. The position of entrance/exit doors should reflect the length of materials stored.

4.42 As controlled receipt and issue is desirable, the location of this store should preferably be in close proximity to the internal works materials and equipment store to allow the storekeeper overall control of receipt and issue of these items.

Emergency equipment store

4.43 A small locked store, for building and engineering equipment required for emergency purposes outside normal working hours, should be provided at a conveniently accessible location under the overall control of a designated works officer. The store should be dry and well ventilated and any authorised person should be able to gain access, ie on-call persons who may require the equipment for emergency use.

4.44 The types of equipment likely to be stored at this location includes water pump and hoses, small portable generator, ropes, safety barriers, warning lanterns, torches and other similar equipment which may be required to deal with an engineering or building emergency.

Access equipment storage

4.45 Ladders should to be hung on wall hooks, with their stiles horizontal and their rungs vertical, at a readily accessible height for lifting. Security precautions, such as the provision of chains with padlocks, will be needed. The storage space should be 6 metres in length and should be protected by a lean-to roof if it is located in the external storage compound; alternatively this storage may be provided within a building. In either case, adequate means of access should be available for manoeuvring the ladders.

4.46 Space will also be required for short ladders and stepladders, which may be stored vertically.

4.47 Scaffolding falls into two categories:

a. tubular scaffolding, including putlogs, couplers, base plates and other accessories. Horizontal racking is required for the tubular components and scaffold boards; boxes are required for the fittings and accessories. Only a relatively small amount of these items is likely to be held, and they can be stored in the external storage compound. (It is anticipated that local works department operational policies will foresee that specific requirements for significant amounts of tubular scaffolding be provided on a supply and erect basis by a specialist scaffolding hire firm);

b. lightweight portable frame scaffold units, either built up from sections or which extend and fold as an integral unit. These units are used by both engineering and building staff and could also be used by cleaning staff. They need to be stored under cover and the space required will be determined by the amount and type to be held.

4.48 Other proprietary forms of mobile access equipment may be provided to suit specific local requirements. These items also need to be stored under cover and the space required will be determined by the amount and type of equipment held.

External storage compound

4.49 A secure area is required for the external storage of bulky items which are not affected by the weather. It can be used for bricks, blocks, paving slabs and other concrete products, drain pipes and associated fittings and for such materials as sand, shingle and other ballasts which should be retained in bays.

4.50 Space should also be provided for a refuse skip, or other storage, for materials and equipment awaiting disposal as scrap.

4.51 This compound may be formed by a perimeter wall or fence having a minimum height of 2.1 metres. A gate should provide vehicular access from the site roads to enable a delivery lorry to enter and heavy goods to be unloaded in the storage compound without double handling.

4.52 Entry/exit and receipt of goods should be controlled by the storekeeper and therefore it is desirable to locate this compound in proximity to the works store.

OTHER WORKS DEPARTMENT ACCOMMODATION

Offices

4.53 A range of offices will be required within the works department. Their design should be in accordance with the recommendations for offices described in HBN18 – 'Office accommodation in health buildings'. The precise number and arrangement of the offices and workstations will be dependent on local works management arrangements and estate operational policies, but it is envisaged that the following will typically be required:

a. an office for the works manager having a Type 2 office workstation;

b. a combined office for the engineering managers and the building manager having three office workstations, one shared computer workstation, space for a drawing board and storage for drawings, contract documentation and records;

c. an office for the planner/estimator having a Type 3 office workstation with additional filing and storage space for planned maintenance schedules, work study data and job cards;

d. an office for technical supervisors having two office workstations, one shared computer workstation together with storage for maintenance manuals, technical reference data, operational and emergency procedure manuals;

e. a general administration/records office having two Type 5 clerical workstations and one Type 5 computer workstation with additional filing and plan chest space for estate record plans, condition survey reports, statutory inspection reports/registers and other estate and asset record data. Further space may also have to be provided for a drawing printing machine and associated stationery storage if a commercial printing service is not conveniently available locally to the hospital site;

f. an enclosed office having one Type 6 clerical workstation and at least one Type 5 computer workstation to accommodate the building management system for the hospital. This office will not necessarily be manned continuously, but will be visited frequently by works staff who need to interrogate and communicate with the system in the normal course of day-to-day operation and management of the building and engineering services. The printers associated with the WIMS and other works computer systems may also be located in this office to mitigate disturbance from printer noise in the general office accommodation of the works department.

Male staff change and toilets

4.54 Male staff changing and toilet accommodation should be provided in close proximity to the works department workshops. This should include:

a. WCs;

b. hand-washing facilities;

c. urinals;

d. shower;

e. individual lockers.

The number of each of the above should comply with the minimum as laid down in the Factories Act 1961. The spaces should be well ventilated by either natural or mechanical means.

4.55 Local operational policy may allow this accommodation to be exclusive to works department staff or it may be shared by other departments in the surrounding area. The needs of the disabled should also be considered within the design of this accommodation.

Female staff change and toilets

4.56 The changing and toilet needs of female staff employed in the works department should be provided in convenient proximity. As indicated for male staff accommodation, local operational policy may allow this accommodation to be exclusive to works staff or it may be shared by other departments situated in the surrounding area. The needs of the disabled should also be considered within the design of this accommodation.

4.57 This accommodation should include:

a. WCs;

b. hand-washing facilities;

c. shower;

d. individual lockers.

The number of each of the above should comply with the minimum requirement of the Factories Act 1961. The spaces should be well ventilated by either natural or mechanical ventilation.

Mess/rest-room

4.58 This room should be provided for work staff to take beverages and food during rest breaks in accordance with statutory requirements. Local operational policy may allow this room to be exclusive to works staff or it may be shared with other departments as a communal facility.

4.59 It should have adequate ventilation, potable cold water supply, refrigerator, beverage making and snack heating facilities, hot water supply and a sink and drainer to allow utensils to be washed. Tables and suitable seating arrangements should also be provided.

Cleaners' room

4.60 This room should be equipped with hot and cold water, sink unit and drainer, storage cupboards and shelving. Space for storing mechanical cleaning equipment will also be required. Adequate ventilation should be provided.

4.61 This room may be exclusive to the works department or may be used by hospital cleaners to carry out the cleaning function of other departments located in the surrounding area.

Electrical switchroom

4.62 A switchroom or cupboard will be required for housing the main isolator and distribution switch/fuse gear for the department. It should be dry and well ventilated with a door which is lockable and opens outwards. It should be positioned so as to minimise the cost of cabling required to serve the department.

GROUNDS AND GARDENS MAINTENANCE ACCOMMODATION

4.63 The following paragraphs describe the range of optional accommodation which may be required to fulfil the general functional requirements for grounds and gardens maintenance described in Chapter 3. Whether or not all of this accommodation needs to be provided will depend on the character and extent of the site and the local estate operational policies.

Supervisor's office

4.64 Facilities should be provided for the head gardener to keep records and complete necessary paperwork. On small sites this may be simply a desk and filing cabinet but on large sites an office complete with telephone is usually required. A Type 6 office workstation (as described in HBN 18 – 'Office accommodation in health buildings') should be appropriate and may be sited within the works department.

Mess and changing facilities

4.65 Accommodation needs to be provided so that grounds maintenance staff can take breaks away from their place of work and, on occasions, shelter from inclement weather. Changing accommodation complete with clothes lockers, hand-washing, shower and toilet facilities should be provided. Grounds maintenance staff are often required to work in inclement weather. Therefore, in addition to a normal changing room, facilities must be provided to dry off clothing and store outdoor protective clothing. The changing and mess facilities within the works department may be enhanced to provide for grounds and gardens maintenance staff.

Machinery and equipment store

4.66 This store is required to accommodate such items as grass cutting machines, cultivators, hedgecutters, spreaders and hand tools. The size of the access doors is dependent on the size of the machines. The machinery store should be well ventilated. Bulk stocks of fuel and chemicals should not be stored in this room, although motorised equipment is likely to contain fuel for the immediate use of the machinery.

4.67 A part of this store should be segregated to provide secure storage for machinery accessories, tools, consumable items, aerosol sprays, safety equipment, etc. Racking, shelving and lockable cupboards will be required.

Hard-standing for vehicles

4.68 It is not considered economic to provide garages for road-going vehicles, tractors and trailers. Hard-standing within a locked compound should be provided for these vehicles with adequate space for turning and routine checking and cleaning.

Propagating greenhouse/potting shed

4.69 It is envisaged that a proprietory design of appropriate size will be selected if this accommodation is to be provided. A cold water supply tap, either adjacent or within, is required. Some form of heating may be required and consideration should be given to diversion of waste heat extracted from the main hospital buildings, if practicable.

Cold frames and nursery area

4.70 If the local policy is to grow the hospitals own bedding plants an area needs to be allocated for growing-on plants propagated in the greenhouse. This area will include covered cold frames and a plant nursery area. The nursery area should also include space for propagation and growing-on of shrubs and small trees.

Road salt and grit store

4.71 Because grounds staff are usually involved with spreading these materials, a suitable location for this store is often adjacent to the grounds and garden equipment store where the equipment for spreading is usually kept when not required. Purchase of materials for this function is usually dictated by a suitable bulk quantity being obtained in one single delivery. Therefore, consideration should be given to providing storage space for between 10 – 20 tonnes. This store requires to be dry, secure and positioned to allow vehicular access. Entrance doors should allow ease of access with vehicle or barrow depending upon local purchasing and operational policies.

Chemical store

4.72 Weedkillers, herbicides, and pesticides must be stored in a separate locked store with natural ventilation and a trapped sump as required by the Control of Pesticides Regulation 1986 made under the Food and Environment Protection Act 1985.

Fertiliser store

4.73 Fertilisers should be stored in a separate locked and ventilated store. Fertilisers should not be stored with other chemicals. They should not be stored adjacent to machinery, in order to avoid corrosion from spillages.

Fuel store

4.74 Arrangements will need to be made for the provision and storage of fuel for motor driven machines. Bulk fuel in drums must not be stored in the same room as garden machinery. The Petroleum (Consolidation) Act 1968 requires fuel to be stored separately in a protected store with ventilation and a trapped sump. These storage requirements should be provided as part of the flammable liquids store for the works department described in the following paragraphs.

ESSENTIAL COMPLEMENTARY ACCOMMODATION

Flammable liquids store

4.75 The storage of flammable liquids and highly flammable materials constitute a special fire risk. The aim should be to contain such items in a specially constructed storage building, separated from the main buildings where possible, accessed from the open air. It should be constructed and lined to form a liquid impervious bund without drainage to contain any spillage. The entrance door or doors should be positioned above the height of the bund. It may be preferrable to position the floor below ground level which will also improve access.

4.76 Construction of the storage building should comply with the requirements of all relevant legislation including:

a. The Hospital Technical Memoranda incorporated in FIRECODE;

b. Petroleum (Consolidated) Act 1968;

c. The Highly Flammable Liquid and Liquified Petroleum Gases Regulations 1972;

d. Guidance Note CS2, published by the Health and Safety Executive.

4.77 Some metal shelving should be provided to allow the contents of this store to be suitably racked. The store should be very well ventilated, preferably by natural means. If mechanical ventilation is used the system should

be suitable for use with flammable vapours. All lighting should be switched from outside the building in the open air, wherever possible. However, in some situations the use of explosion-protected electrical apparatus, selected in accordance with the degree of risk, will be necessary.

4.78 The entrance door or doors should display the notice "Highly flammable store – No smoking – No approach with naked light". It is also advisable to display the "HAZCHEM" signs relative to the chemical contents of the store.

4.79 This store may be exclusive to the works department or it may be enlarged and conveniently sited to cater for the requirements of other departments, for example pharmacy and pathology.

Gas cylinders store

4.80 An open compound, or a well ventilated room, properly secured will be needed for the storage of industrial gas cylinders. These may include:

a. oxygen;

b. acetylene;

c. liquified petroleum gases (LPG), for example propane and butane;

d. refrigerant gases.

4.81 The compound or store should be constructed and located to comply with the recommendations of the 'Code of Practice for the Storage of Medical, Pathology and Industrial Gas Cylinders' issued with WKO(85)1. (In Wales, CAWO(85)1.) The guidance contained in this Code of Practice represents the minimum standard applicable to all new installations and is based on the concept of having a main store for all cylinders of compressed gas on a particular site. It recommends that, within this main store, cylinders having incompatible contents, for example flammable and oxidising gases, should not be stored together and that medical gases should be stored together in a separate area within the main cylinder store.

4.82 In respect of LPG storage, the principles of SI 917 – The Highly Flammable Liquids and Liquified Petroleum Gases Regulations, 1972 – should be followed, as appropriate. Detailed guidance on the storage of LPG is given in the Health and Safety Executive's Guidance Notes CS4 and CS5.

Corrosive liquids store

4.83 A room having good natural ventilation should be provided for the storage of corrosive liquids such as acids, descaling fluids, chlorine based chemicals and liquid detergents. The internal layout should enable physical separation and segregation of containers from which any leakage or spillage would initiate a hazardous chemical reaction if intermixed.

4.84 It should be constructed and lined to form a liquid impervious bund without drainage to contain any spillage. The entrance door or doors should be positioned above the height of the bund. It may be preferable to position the floor below ground level which will also improve access.

4.85 Non-metallic shelving for the storage of drums and carboys should be provided. Warning and "HAZCHEM" signs should be displayed on doors; information on how to deal with accidents or spillage should be available and preferably displayed. A cold water tap and drain should be available adjacent, but external, to the store. Handwashing facilities should also be conveniently available nearby.

4.86 This store may be exclusive to the works department, but may be shared with other departments having a requirement to store corrosive liquids.

OPTIONAL ACCOMMODATION AND SERVICES

Electric vehicles charging room

4.87 There is a need to maintain and charge battery operated vehicles daily. Normally these vehicles will be garaged overnight at the location where charging is occuring.

4.88 Because of explosive risks associated with charging lead/acid batteries, the charging room should be well ventilated by either natural or mechanical means. If mechanical ventilation is used the equipment should be suitable for use with corrosive and flammable vapours. Warning signs indicating "NO SMOKING OR NAKED FLAMES" should be displayed at entrances.

4.89 The floor of this room should be marked out to indicate the correct position of each vehicle in relation to its charging unit. Suitable electrical points and a plinth or wall fixing should be provided for each of the charging units. The latter are normally dedicated to, and purchased with, each particular vehicle.

4.90 Sufficient space should be provided for the vehicle, its charging unit and for vehicle manoeuvring; typically 6m² per vehicle will be required.

Vehicle garages

4.91 Consideration should be given to the possible requirements for garaging works vehicles. These may be individual garages or be part of a much larger garaging provision. The physical size of the vehicles to be garaged needs to be taken into account, particularly their overall height when equipped with ladder racks etc. Typically 18m² per vehicle will be required.

4.92 If provided, garages should have easy access from the site road system to allow safe manoeuvring of vehicles without obstruction. They should have a hard standing to the front with suitable falls and drains together with an adjacent cold water supply to allow regular washing of vehicles.

4.93 The garages would be for parking and security purposes only. It is not envisaged that any vehicle servicing or repairs would be carried out within this accommodation. (See paragraph 1.5.)

Glass and glaziers' workshop/store

4.94 A small workshop/store may be required for the storage of glass stocked to repair broken glazing. This may be stored precut to size or some cutting facility may be required.

4.95 It should be equipped with wooden pallets and dividers to allow vertical storage, and a steel bin to allow safe storage of broken glass awaiting disposal. A suitable cloth covered table will be required if glass cutting is to be undertaken.

4.96 A secure cupboard should be provided for the storage of safety clothing, for example leather aprons, gloves and eye shields.

5.0 Specific functional and design requirements of EME and other specialised workshops

Introduction

5.1 This Chapter describes the workshops, offices, stores and other accommodation which will be required to fulfull the general functional requirements for EME equipment servicing and the other specialised workshops described in Chapter 3.

Electronic servicing area

5.2 Floors and walls should have light-coloured, easily cleaned, oil-resistant surfaces. Concrete or quarry tiled surfaces are not recommended. The provision of an anti-static vinyl floor should be considered. Alternatively, conductive rubber matting may be provided at each workstation.

5.3 Work-benches should not be of metal construction nor have metal tops. Wooden laboratory type benches are recommended. These should have anti-static laminated plastic surfaces with coved rear upstands and bull-nosed front edges. Alternatively anti-static vinyl covered surfaces with welded seams to prevent contaminants being absorbed by the timber may be provided. Stools with adequate back support should be provided for bench work.

5.4 Linear type benching arranged around the walls is inappropriate for safe working practices. "L" shaped benches protruding from the wall allow the workspace within the "L" to be enclosed and designated as a controlled area when work has to be undertaken on "live" equipment. This can be achieved by using plastic link chain extended across the entrance to the workspace to prevent unauthorised entry during "live working" procedures.

5.5 Storage units or cupboards should be provided under benches for tools and test equipment. Knee holes between units will be required where technicians work at benches. Standard laboratory cupboards are very suitable. An equal selection of drawer and cupboard units is recommended.

5.6 Strong shelves over benches should be provided for test equipment normally in use at the benches. A shelf 300mm wide at a height of approximately 1500mm above floor, and set 50mm clear of vertical supports to allow cables and plug tops from equipment to pass behind, is very suitable. Where these are fitted away from a wall, care should be taken not to obscure the view across the workshop.

5.7 Six twin socket-outlets per workstation should be provided – at the wall or back of the bench tops. Special electrical safety features must be incorporated on the mains voltage supplies and earthing arrangements serving these workstations. (See paragraph 7.68 for details.) No adventitiously earthed metallic structure or fittings such as radiators or pipes should be within easy reach of a technician sitting at a workstation.

5.8 Extra-low voltage AC or DC supplies should be obtained from individual portable transformer units or DC power units. The use of secondary cells for DC supplies is not recommended.

Mechanical servicing /dusty procedures room

5.9 The work bench in this space is also recommended to be of the laboratory type, but having impervious surfaces suitable for predominantly mechanical work.

5.10 Storage units or cupboards under the bench should be provided in a similar manner to the electronic servicing area. Some strong shelving over the bench should also be provided but the amount of test equipment in use in this area will not normally be as extensive as in electronic servicing.

5.11 Two twin socket-outlets should be provided – at the wall or back of the bench top. Electrical safety features should be incorporated on the mains voltage supplies to these. (See paragraph 7.69 for details.)

5.12 Medical quality compressed air (at 4 bar) should be available via standard terminal outlets at the workstation. Piped supplies from the hospital central medical gases systems are preferred if these can be installed economically. Medical gases should not be stored within the EME workshop; cylinder supplies will usually be obtained from, and returned to, the pharmacy department when required.

5.13 Fixed tools and equipment should include:

a. screw cutting centre lathe;

b. pedestal grinding machine;

c. bench mounted drilling machine;

d. bench vice;

e. Belfast sink with hot and cold water supplies.

Equipment decontamination area

5.14 A space or room segregated from the rest of the EME workshop should be provided for the procedures associated with decontaminating EME equipment by chemical means. It should contain a specially equipped and ventilated decontamination cabinet (see Appendix 1 for specification details) and an adjacent workbench. A sink with drainer, having hot and cold water supplies, and separate hand-washing facilities should also be provided.

5.15 Careful siting of the decontamination cabinet is necessary to ensure that its ventilation performance is not adversely affected. This cabinet should be remote from the door or opening into the space and from any openable window. In addition there should be a designated working zone, extending at least 1m from the face of the cabinet, which is free from general pedestrian traffic. Transfer grilles, or other means of supplying make-up air to this space, should be sited and arranged to ensure a turbulence-free air supply to the face of the cabinet.

5.16 The extract from the decontamination cabinet need not be filtered but should discharge direct to external atmosphere in a suitable location. (See paragraph 7.30.) The extract fan may be integral with, or adjacent to, the cabinet if the discharge duct is airtight and relatively short (less than 2 – 3 m in length) otherwise it should be sited close to the discharge end so that any substantial length of ducting is under negative pressure.

5.17 A hot and cold water supply, will be required to serve outlets in the decontamination cabinet. Appropriate arrangements against back syphonage, including the provision of a break tank, must be provided on these connections. The hot water supply should also preferably have a local thermostatically controlled mixer. An industrial compressed air supply will also be required to serve an outlet in the decontamination cabinet. Controls for these services should be incorporated on the front face of the decontamination cabinet.

Store

5.18 Secure storage space should be provided either within, or immediately adjacent to, the electronic and mechanical servicing areas for stocks of the basic discrete components, modules, consumable items and special tools needed for EME equipment servicing. These are usually physically small and several hundred different items will be needed to service the range of EME equipment likely to be found in a typical DGH. Orderly storage in labelled bin and drawer units of appropriate size is essential to efficient working practice and an appropriate amount of such storage should be provided. Shelving will also be required for certain complete spare sub-assemblies and for equipment undergoing repair but awaiting spares.

Office accommodation

5.19 Office accommodation for the manager of technical servicing should be equipped for carrying out administrative tasks and for discussions with staff. A Type 3 office workstation, as described in HBN18 – 'Office accommodation in health buildings', is suitable for these functions. The office should be glazed to afford as much visual contact with the workstations as possible as part of the provisions and procedures for optimum safe working practice.

Technical information and records library

5.20 A separate Type 5 or 6 office workstation, with additional space for filing cabinets and storage shelving, should be provided for routine clerical and administrative tasks and for the upkeep and storage of the library of equipment asset registers, technical manuals and suppliers' service schedules, as described in detail in HEI 98. A computer terminal should be provided; this may require a data link to the works department WIMS computer.

Staff change and toilets

5.21 Male and female staff changing and toilet accommodation should be provided in close proximity to the EME workshop. Facilities may be shared with other departments where it is convenient to do so.

The accommodation should include:

a. WCs;

b. hand-washing facilities;

c. lockers.

The scale of provision should satisfy the requirements of the Factories Act 1961.

Electrical switchroom

5.22 A switchroom or cupboard will be required for housing the main isolator and distribution switch/fuse gear for the department. It should be dry and well ventilated with a door which is lockable and opens outwards. It should be positioned so as to minimise the cost of cabling required to serve the EME workshop.

Satellite EME workshop

5.23 This facility will be required only in the circumstances described in paragraph 2.35.

5.24 Two electronic workstations, as described in paragraphs 5.2 to 5.8, should be provided, one of which should be fitted additionally with a bench vice and a medical compressed air outlet.

5.25 The space allocated should be sufficient to allow servicing and repair in the satellite workshop of free standing equipment such as nursing incubators, diathermy equipment, etc.

5.26 A secure storage cabinet is required to enable equipment undergoing repair, but awaiting spares, to be locked away to prevent unauthorised tampering. Shelving is required for the storage of other work in progress and items awaiting attention.

5.27 Some filing space will be required for equipment records, as dictated by local operational policies.

5.28 Hand-washing facilities should be provided together with a separate stainless steel sink unit, with single drainer and hot and cold water supplies, to permit normal cleaning only where this is found to be necessary during equipment servicing. (See paragraph 2.12 to 2.15 regarding decontamination procedures for equipment which is, or is suspected to be, contaminated.)

OPTIONAL ACCOMMODATION AND SERVICES

Anaesthetic equipment workshop

5.29 When this facility is provided there may be organisational and management advantages if the accommodation is integrated with the EME workshop on the selected site. Such integration will also provide scope for combining office and store spaces with some consequential reduction of circulation and departmental areas.

5.30 Sufficient space should be allocated to allow servicing of free standing equipment and to store equipment awaiting attention or serviced equipment awaiting return to its original location.

5.31 Two mechanical workstations should be provided, as described in paragraphs 5.9 to 5.11. This will provide a base for 4 technicians because a significant proportion of the workload will be carried out in-situ.

5.32 Both workstations should have a medical vacuum terminal outlet and, for test purposes only, a full range of medical gases terminal outlets (ie nitrous oxide, oxygen, entonox and medical compressed air) all connected to the 4 bar medical compressed air supply. To prevent confusion these should be clearly labelled "TEST PANEL – GAS TERMINALS CONNECTED TO 4 BAR COMPRESSED AIR ONLY". Medical compressed air and medical suction should preferably be obtained from the hospital central distribution systems for medical gases.

5.33 Although medical compressed air will be used wherever possible for the testing and calibration of equipment undergoing servicing, there will be the need to use anaesthetic gases for some tests. Therefore each workstation should also be provided with a connection to an active anaesthetic gas scavenging system to reduce atmospheric pollution to an acceptable level. A proprietory integrated receiving and disposal (IRD) unit – which uses 4 bar medical compressed air to induce a scavenging vacuum via an inbuilt venturi device – will usually be adequate for such test procedures. It should discharge externally.

5.34 Medical gases for test purposes are usually obtained from portable cylinders, but piped supplies from the hospital central medical gases installations may be provided if these can be installed economically. If this is arranged then very clear labelling should be provided to differentiate the active terminal outlets from the test terminal outlets which are connected to 4 bar medical compressed air. Medical gases should not be stored within this workshop. Cylinder supplies will usually be obtained from, and empties returned to, the pharmacy department when required.

5.35 A rigid and securely fixed bench should be provided for mounting the hydraulic press required for fitting the terminal connectors to flexible high pressure hoses.

5.36 Wall mounted racks with plastic storage drawers for small components and lockable steel cupboards for spare assemblies, calibrated vapourisers, coils of spare hose, specialist tools and test equipment, etc, should be provided.

5.37 Hand-washing facilities should be provided.

5.38 Office accommodation for the supervising technician should be equipped for carrying out administrative and technical records tasks and for discussion with staff. A Type 3 office workstation is suitable. Maximum visual contact from the office to the workshop area is also required as part of the provisions and procedures for optimum safe working practice.

Audiology equipment workshop

5.39 Audiology equipment servicing will be carried out in this workshop and any quiet space will be adequate for virtually all audiometric calibration.

5.40 The workshop should be located in a zone with low structural vibration and a low level of background noise. It should be sited adjacent to an audiometric measurement room in the hospital's audiology department so that this may be used outside clinic hours for calibrating free-field audiometric equipment. In exceptional situations, where such an arrangement is not possible, a sound proof cabinet may be required within the audiology equipment workshop for free-field calibrations. This need not have an onerous performance specification because most free-field audiometers do not respond below 250Hz.

5.41 The space allocated should be sufficient to hold equipment awaiting recalibration or servicing, work in progress awaiting delivery of spares and serviced equipment awaiting return to users. Account should be taken of the likely peak storage requirement associated with the community health care sector which usually makes its equipment available for recalibration and servicing during school holiday periods.

5.42 Two electronic workstations should be provided, as described in paragraphs 5.2 to 5.8.

5.43 Wall mounted racks with plastic storage drawers for components and spares should be provided.

5.44 A Type 5 office workstation with filing space should be provided for carrying out the associated administrative and technical records tasks. If this is provided in a separate office it should have maximum visual contact to the workshop area as part of the provisions and procedures for optimum safe working practice.

Renal dialysis equipment workshop

5.45 This facility should be provided to support the operation of, and be integrated with, the renal unit or department. Because renal units are usually only provided as a speciality service, not every DGH site will have this accommodation.

5.46 Access doors should have at least 1½ leaves to provide sufficient width for the safe handling of dialysis machines into and out of this accommodation. A working area is required that enables both wet and dry activities to be undertaken simultaneously in a single space. In the wet area the flooring and drainage system should be suitable for washing down and flushing out dialysis equipment. In the dry section the flooring should be as for an electronic workshop. Quarry tiles in the wet area and either welded seam conductive vinyl or welded seam vinyl with conductive rubber mats in the dry area are appropriate floor finishes.

5.47 One electronic workstation and one mechanical workstation, as described in paragraphs 5.2 to 5.12, should be provided in the dry area.

5.48 The wet area should have sufficient space to give all-round access to two dialysis machines approximately one metre square each. A purpose-designed stainless steel sink unit should be provided for washing down dialysis equipment sub-assemblies. This should have storage under for 5-litre containers of detergents and other chemicals. A purified water supply should be provided to a twin outlet wall mounted terminal unit which matches the special self sealing "quick connect" couplings used on dialysis equipment hoses. Similarly a low level drainage upstand with twin self sealing connectors should be provided to match the open ended probes used on dialysis equipment drainage hoses.

5.49 Hand-washing facilities should be provided.

5.50 Shelving and plastic drawer units are required for ready-use component and test gear storage. Wall mounted display panels are required for statutory notices and systems diagrams. Storage is also required for protective clothing including rubber gloves, aprons, rubber boots, goggles/facemasks and laboratory coats.

5.51 A store room should be provided for spare sub-assemblies, components and disposables.

5.52 A separate lockable store should be provided capable of holding up to four home dialysis machines and four water treatment units. This is for equipment allocated to specific patients and awaiting return at the next service visit which, meanwhile, must be kept separate to avoid cross infection.

5.53 In addition, a storage area should be provided for ready-to-use dialysis equipment pending its utilisation on the renal unit ward. This requires clean storage conditions, enclosed to prevent unauthorised access, but readily available in the event of an emergency and having easy access to the user areas.

5.54 An office area having a Type 5 office workstation should be provided, with additional space for up to three 4-drawer filing cabinets and shelving for the technical handbook and catalogue library, plus seating for up to four people. Maximum visual contact from this office to the wet/dry workshop area is also required as part of the provisions and procedures for optimum safe working practice.

5.55 The plant for the production of the purified water supply and its accommodation should be provided as part of the renal unit and is therefore excluded from the cost allowances associated with this Note. This plant room should incorporate space for a local maintenance workbench, fitted with a vice, and an adjacent lockable storage cupboard.

6.0 General guidance

Introduction

6.1 This Chapter contains guidance concerning aspects of function and design which are common to health buildings generally and which will need to be borne in mind when designing a new works department and EME workshop or upgrading existing premises.

Statutory and other requirements

6.2 This Note takes account as far as possible of all statutory and other requirements in force at the time of publication, but health authorities are reminded of their responsibility for ensuring compliance with all relevant statutes, regulations, codes and standards. Advice on this is given in HC(88)60/HC(FP)(88)29 – in Wales, WHC(89)20.

With the general removal of Crown immunity from the NHS after 1 April 1991 and the setting up of NHS Trusts, building and planning law are legally enforceable on the NHS. Guidance on the removal of Crown immunity is given in HN(90)27/LASSL(90)15 – in Wales, WHC(91)4 – in respect of a wide range of legislation.

Upgrading or adaptation of existing buildings

6.3 The standards set out in this guidance essentially apply to the provision of accommodation by new building and it is not intended that they should be applied retrospectively to existing stock. However, the principles are equally valid and should be applied, so far as it is reasonably practicable, when existing accommodation is being upgraded or new accommodation is being constructed within an existing building, which may previously have been used for other purposes. In such cases, the aim should be to meet Health Building Note standards, wherever possible, although it is recognised that compromises will inevitably have to be made.

6.4 The cost of upgrading work should conform to the guidelines indicated in the Department's WKO letter (81)4 issued on 24 July 1981. (In Wales, AWO(81)8 issued on 14 August 1981.) The guidelines take into consideration the estimated life of the existing building and the difference in cost between upgrading a building and new building.

6.5 Before any decision is made to carry out an upgrading project, consideration must be given to the long-term strategy for the service; the space required for the new service, and the size of the existing building. Regard must also be paid to the orientation and aspect of the building and the adequacy and location of all necessary support services.

6.6 If there emerges a prima facie case for upgrading, a thorough analysis of all functional and physical conditions of the existing building should be undertaken.

6.7 When comparing the cost of upgrading or adapting an existing building to that of a new building, in addition to the building cost due allowance must be made for the cost of relocating people, demolition and salvage costs, disruption of services in a phased project, and the temporary effects on running costs of any impaired functioning of areas affected by upgrading.

6.8 The check of physical and other aspects of existing buildings should include:

a. availability of space for alteration and additions;

b. type of construction;

c. insulation;

d. age of the buildings, condition of fabric, eg external and internal walls, floors, roofs, doors and windows, which may be determined by a condition survey;

e. life expectancy and adequacy of engineering services, ease of access and facility for installation of new wiring and pipework, if required;

f. the height of ceilings (high ceilings do not necessarily call for the installation of false ceilings which are costly and often impair natural ventilation);

g. changes of floor levels to obviate hazards to disabled people;

h. fire precautions (see paragraphs 6.13 – 6.16);

j. physical constraints to adaptation such as load-bearing walls and columns.

6.9 Having decided that existing premises are suitable for upgrading or conversion, the main requirement will be to assess how best the accommodation can be adapted so as to facilitate good practice.

6.10 The main environmental factors which should be considered are the same as for new building.

6.11 Upgradings must conform to current fire safety and other statutory regulations. It is very difficult to estimate the fire resistance of floors, walls and doors of existing buildings.

6.12 This summary of the main aspects of upgrading is necessarily general in character and it is recognised that each upgrading project will present its own individual problems. In many instances, compromises may have to be made between Health Building Note standards and what is possible to achieve. Upgradings should be functionally sound – not merely cosmetic – and appropriate for the projected needs of patients and staff for a number of years to come.

Fire precautions

6.13 It is essential that project teams familiarise themselves with the guidance in the 'Firecode' series of documents which contain the Department's policy and technical guidance on fire precautions in hospitals and other NHS premises. In particular, the need for structural fire precautions and means of escape from the whole accommodation must be taken into account at the earliest possible planning stage. The key document for these aspects in new hospitals is HTM81.–'Fire Precautions in New Hospitals'.

6.14 In addition, basic policy, principles and key management guidance are contained in 'Firecode-Policy and Principles'. Other 'Firecode' documents include the Health Technical Memoranda '80' series (which give technical guidance on various building, engineering and equipment issues), the Fire Practice Notes series (dealing with various specialist aspects of fire precautions) and Nucleus guidance. Existing HTMs will, in due course, be reissued in 'Firecode' format. The suite includes 'Firecode-Directory of Fire Documents' which lists references to relevant legislation and relevant fire precautions guidance issued by the Department and other sources, for example, the Home Office. Publications in the existing HTM '80' series are listed in the Bibliography at the end of this Note.

6.15 It is important to establish during the design stage those aspects of fire safety strategy which affect the design, configuration and structure of a project. At appropriate stages of the design process, the architect and engineer should discuss and verify their proposals with the local fire authority, and ensure that the project team and all other planning staff are fully acquainted with the fire safety strategy for the design in terms of operation (staff responsibilities, etc), equipment provision, and buildings and engineering layouts. HTM's 56 to 60 give detailed information on the selection of fire resisting components. HTM65 gives detailed guidance on signs in hospitals.

6.16 The principles of fire safety apply equally to new projects and to alterations and upgrading of existing buildings.

Smoking

6.17 Health Circular HC(85)22 dated May 1985 – in Wales, WHC(85)31 dated June 1985 – provides guidance about smoking on health premises. While recognising that responsibility for determining local policies rests with the health authority, the circular recommends that smoking should be restricted as far as is practicable and, where it is permitted, confined to specially designed areas which are clearly signposted. In such areas ventilation should be sufficient to prevent discomfort to non-smokers and the spread of odours to other areas of the premises.

Component Data Base

6.18 The Component Data Base consists of a series of Health Technical Memoranda which provide specification and design guidance on building components for health building.

6.19 The HTMs in the series are listed in the Bibliography at the end of this Note.

6.20 The technical information in this series is the result of research and development funded by the Department as part of collaborative working arrangements over a number of years between the Department, the NHS and industry through the medium of Component Data Base, managed by a Steering Group mainly staffed by NHS professionals.

7.0 Engineering

Introduction

7.1 This Chapter describes the engineering services contained within a works department, an EME workshop and other special workshops, and their possible integration with the engineering systems serving a whole site. Its purpose is not to inhibit the design solution but to acquaint the engineering member of the multi-disciplinary design team with the design criteria, material specifications, and reference data needed to meet the functional requirements.

7.2 Documents referred by number, for example [10], are listed at the end of this Chapter. They are numbered in order of first appearance, repeated references retaining the same number.

Model specifications

7.3 A series of model specifications for the specialised engineering services in health-care buildings have been issued nationally and are sufficiently flexible to reflect local needs. The cost allowance for the engineering services in each functional unit of this department is based on the qualities of material and workmanship described in the relevant parts of the model specifications.

Economy

7.4 Engineering services are a significant proportion of the capital cost and thereafter remain a continuing charge on revenue budgets. The project design engineer should therefore ensure not only utmost economy in initial provision, consistent with meeting the functional requirements and maintaining clinical standards, but also the optimum benefit from the total financial resources these services are likely to absorb during their lifetime.

7.5 Where alternative design solutions are available, their consequential capital and running costs should be compared using option appraisal techniques [1] so that due consideration is given to the need for, and the costs of, maintenance and the eventual replacement of plant and equipment.

7.6 The economic appraisal of alternative design solution should include the heat conversion and distribution losses at the point of use. Where buildings are located remote from the development's load centre, these losses can often equal the useful energy consumed.

7.7 In any new project, consideration should be given to energy management and to the facilities offered by a whole hospital control system to enable some measure of energy accounting to be exercised at departmental level.

7.8 After satisfying the Building Regulations [2] on the standards of thermal insulation provided, consideration should be given to the economics of additional insulation. Similarly, in view of the increasing costs of energy, consideration should be given to the economic viability of heat recovery from mechanical ventilation systems and also for programmed turning-off, or reduction, of heating and ventilation in those spaces used only for part of the day.

Maximum demands

7.9 User demand on engineering services is often difficult to predict, but experience indicates that services designed for simultaneous peak conditions are seldom fully utilised in practice. The estimated maximum demand and storage requirement (where appropriate) for each engineering service in this accommodation will need to be assessed individually to take account of the range, size and shape of the functional units, geographical location, operational policies and intensity of use. As a guide, and for preliminary planning purposes only, the following are the estimated maximum demands for a works department suitable for a District General Hospital of 350-649 beds and for the minimum viable size of EME workshop described in this Note.

works department (350-649 beds)

Service	Typical		Notes
	Maximum	Demand	
Heating/ventilation (kW)	56		
Cold water (litre/sec)	0.9		storage 3,000 litres (24 hour supply)
Domestics HWS (litre/sec)	0.8		storage 280 litres (2 hours recovery)
Supply ventilation (m^3/s)	1.1		
Extract ventilation (m^3/s)	1.4		includes 0.2 toilet extract
Electrical (kVA) (3 phase supply)	17.5 (per phase)		includes 16.5 kVA essential
Fuel gas (litre/sec)	No requirement		
Steam	No requirement		
Medical gases	No requirement		

EME workshop (2 workstations in electronic maintenance area)

Service	Typical		Notes
	Maximum	Demand	
Heating/ventilation (kW)	5		
Cold water (litre/sec)	0.2		storage 40 litres (24 hour supply)
Domestics HWS (litre/sec)	0.2		storage 15 litres (2 hours recovery)
Supply ventilation (m^3/s)			incorporated in
Extract ventilation (m^3/s)	0.3		decontamination cabnet
Electrical (kVA) (3 phase supply)	4.5		includes 3.8 kVA essential
Fuel gas (litre/sec)	No requirement		
Steam	No requirement		
Medical gases	No significant requirement		see paragraph 5.12

Space requirement for services

7.10 The satisfactory performance of plant in health care buildings is particularly important and the design should allow for ease and safe means of access and space for the necessary frequent inspections and maintenance and for eventual removal and replacement. As far as practicable, however, this access should be protected from unauthorised entry.

7.11 Recommended spatial requirements for mechanical, electrical and public health engineering services in health buildings are given in HTM23 [3]. The information in HTM23 is specifically intended for use during the initial planning stages when precise dimensional details of plant are not available.

7.12 The distribution of mechanical and electrical services to final points of use should be concealed in ducts, walls and above ceilings other than in the works department workshops and storage areas. Heat emitters should be contained within a 200 mm wide perimeter zone under window sills and critical dimensions should be taken from the boundary of this zone. For costing purposes the 200 mm zone, which includes the floor area occupied by minor vertical engineering ducts, is included in the building circulation provision.

Activity Data

7.13 User requirements, environmental conditions and equipment arrangements, as described in the Activity Data Sheets (Chapter 9), should be referred to when positioning service components and outlets.

Safety

7.14 Section 6 of the Health and Safety at work etc Act 1974[4], as amended by Schedule 3 of the Consumer Protection Act 1987[5], imposes statutory duties on all persons who design, manufacture, import, supply, install or erect "articles for use at work". One of the requirements of this section is to ensure, so far as is reasonably practicable, that the article is so designed and constructed that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work. All parts of engineering systems are covered by the term "articles for use at work" and designers of these systems for health care premises must therefore fulfil their statutory obligations.

Fire safety

7.15 Design guidance for the fire safety requirements in new hospitals is given in HTM 8l [6]. Technical information concerning the design and specification of fire detection and alarm systems is detailed in HTM 82 [7], which also replaces or modifies certain clauses of BS 5839 Part 1[8] to meet the needs of health care premises. More general advice on fire prevention is given in HTM 83 [9].

7.16 The design of the engineering services should accord with the recommendations in the above series of HTMs and the engineer should verify his proposals in accordance with the procedure described in paragraph 6.15.

Noise

7.17 Excessive noise in the individual areas, whether internally or externally generated and transmitted, can adversely affect the operational efficiency of the department and can cause discomfort. The limits and means of control advocated in Hospital Design Note 4 [10], including its revisions [11], and the means of control given in Engineering Data Sheet DH1 [12], should provide an acceptable acoustic environment. In addition to designing for control of noise levels, there may also be a need to ensure speech privacy, ie that confidential conversation is unintelligible in adjoining rooms or spaces. The acceptable noise level and, where applicable, any requirement for speech privacy in the individual spaces in this department is shown on the Activity Data A–Sheets.

Control access

7.18 Primary engineering distribution control and isolation devices should be located in circulation rather than working areas and must be protected against unauthorised operation, for example any switchgear and fuse-boards not located in the departmental switchroom (see paragraphs 4.62 and 5.22) should be housed in secure cupboards.

Engineering commissioning

7.19 It is most important that engineering services should be fully commissioned. HTM 17 [13] describes the requirements which should be included in the design and construction contract documents. Flow measurement and proportional balancing of air and water systems requires adequate test facilities, for example, orifice plates, venturi valves, etc to be incorporated at the design stage.

MECHANICAL SERVICES

Introduction

7.20 The mechanical services include the provision of heating, ventilation, dust extraction, domestic hot and cold water services, compressed air and gas. For cost allowances purposes, the distribution of these services is deemed to commence at their points of entry into the accommodation and includes ductwork, pipework, fittings, controls and connections to equipment and terminal outlets. The cost allowance also includes for an appropriate proportion of the centralised ventilation plants and associated controls serving these functional units.

7.21 The environmental requirements of individual spaces are shown on the Activity Data Sheets. Recommended room temperatures, air change rates, hot water service temperature etc are grouped under "Technical Design Data"on each A–Sheet. The B–Sheets give the disposition of engineering outlets for the activities described.

Heating

7.22 General space heating requirements can usually be met by low pressure hot water radiators operating as a sub-system from the primary heating distribution system. In the works department workshops, fan assisted unit heaters on a separate constant temperature circuit, possibly with fresh air inlet, may be appropriate. These spaces generally have a large amount of wall and floor mounted equipment as well as being subject to frequent opening of external access doors. Fan assisted unit heaters are not appropriate for EME workshops as it is desirable to minimise air disturbance in the vicinity of electronic circuit boards which may be exposed during equipment servicing. Alternatively, consideration may be given to the provision of low pressure hot water radiant panels mounted at high level.

7.23 Radiators should normally be located under windows or against exposed walls, with sufficient clear space between the top of the radiator and the window sill to prevent curtains or blinds reducing the output, and adequate space below to allow cleaning machines to be used. Where a radiator is located on an external wall, back insulation should be provided to reduce the rate of heat transmission through the building fabric.

Temperature controls

7.24 To facilitate overall temperature control, the flow temperature to radiators should normally be modulated relative to the external ambient temperature. All radiators should be fitted with thermostatic radiator valves. These should be of robust construction and selected to match the temperature and pressure characteristics of the heating system. The thermostatic head, incorporating a tamper-proof facility for presetting maximum and minimum room temperature, should be controlled via a sensor located integrally or remotely as appropriate. To provide frost protection at its minimum setting, the valve should not remain closed below a fixed temperature. Frost protection should also be provided for the heating elements of unit heaters having fresh air inlets by means of integral thermostats inhibiting the operation of the fan motors at low water temperatures.

7.25 The heating within the works department and EME workshop should be equipped with time switch control and programmed to accommodate the normal working hours. The control system, preferably incorporating an optimum-start device, should be used to set-back the space temperature by approximately 10°C when the accommodation is closed. To allow for occasional abnormal hours of working, a conveniently sited time restricted over-ride control should be provided for use by authorised staff so that space heating and ventilation systems can be restored to normal operation.

Ventilation

7.26 Recommendations for the ventilation of individual spaces in this department are shown on Activity Data A–Sheets. Mechanical extract ventilation should be provided for battery charging areas and in workshop areas used for welding and the application of adhesives. In addition a comprehensive wood chip and sawdust collection and extraction system should be provided for the woodworking machinery in the joiners workshop. The ventilation systems associated with the extraction of toxic fumes, vapours and dusts should be designed to ensure compliance with the occupational exposure limits set out in the current issue of Guidance Note EH40 [14], published annually by the Health and Safety Executive.

7.27 Mechanical ventilation should generally be arranged to encourage uniform air movement within the space. The design should allow for an adequate flow of air into any space having only mechanical extract ventilation. Transfer grilles should be provided in doors or walls to connect such spaces to either naturally ventilated corridors or other spaces with mechanical air supply. Such arrangements, however, should avoid the introduction of untempered air and should not prejudice the requirements of fire safety or speech privacy.

7.28 Ventilation supply plant should include air filters having a minimum arrestance of 85% and a minimum

average dust spot efficiency of 25%, when tested in accordance with BS 6540, Part 1[15]. Filters must be readily accessible for replacement and maintenance purposes, and be provided with a pressure-differential indicator; coarse pre-filters may be necessary where the intake air is exceptionally polluted. Heater batteries should be sized for the ventilation requirements only, ie not the building fabric loss.

7.29 A separate extract system will be required for "dirty" areas, for example, cleaners rooms and sanitary facilities, and a dual motor/fan unit with automatic changeover should be provided to ensure that these spaces are always maintained at a negative pressure when the accommodation is in use.

7.30 External discharge arrangements for extract systems should be protected against back pressure from adverse wind effects and located to avoid re-introduction of exhausted air into the building through air intakes and windows.

Ventilation of welding area

7.31 Effective control of welding fumes is achieved by local extraction close to the source of the fumes. A manoeuvrable suction hood attached to a flexible connection, which can be positioned close to the emission point, is the most generally adopted method. Fumes should be discharged to external atmosphere by a suitable extract fan and ducting. Guidance on minimum air flow requirements for welding processes is given in a handbook issued by the Welding Institute [16]. Make-up air to the welding bay will usually be provided from the adjoining space or corridors either directly or via a transfer grille.

Ventilation of battery charging areas

7.32 Corrosive and flammable gases generated by the charging process should be extracted and discharged direct to atmosphere via ducting and a suitable extract fan having the drive motor positioned outside the air stream. Materials and components should be suitable for use with chemically aggressive and flammable vapours. An appropriately sized fresh air inlet situated at low level adjacent to the battery charging positions will usually satisfy make-up air requirements.

Ventilation and dust extraction for joiners' workshop

7.33 Mechanical extract ventilation from the area designated for glue and adhesives use (see para 4.21) should be provided. An extract grille should be positioned at low level to deal with heavier-than-air solvent vapours. The exhaust should be discharged direct to atmosphere via ducting and a suitable extract fan having the drive motor positioned outside the air stream. Materials and components should be suitable for use with flammable solvent vapours. Make-up air can be provided via an appropriately sized fresh air inlet or transfer grille situated at the remote end of the working area.

7.34 A wood chip and sawdust collection and extraction system with local on/off control, having connections to each woodworking machine and to a floor mounted suction point for floor sweepings, should be provided in the joiners workshop. The collection unit should have an adequate area of filtration media, an effective filter cleaning mechanism and a disposal arrangement that will not cause a secondary dust hazard. Careful selection of the filter media and its area will usually permit recirculation of the filtered air. An explosion relief device, having a suitable and safe arrangement of the relief vent, should also be provided at the collection unit.

7.35 The ductwork of the wood-dust extraction system should be smooth internally and circular or oval in section. There should be adequate access for cleaning and regulating dampers should be fitted in the connections to each woodworking machine. All materials should be fire resistant. Ductwork velocities should be high enough to avoid solid material settling and dragging along the bottom of horizontal duct runs. Suction nozzles should be sized and sited to achieve appropriate capture velocity at the source.

Controls for general ventilation systems

7.36 Supply and extract ventilation systems should include indicator lamps to confirm the operational status of each system. Where a system is provided for a particular space the indicator should be in or immediately adjacent to that space and local controls should be provided as appropriate. Where the use of the system is on a regular daily pattern, timed control with manual override for a limited period should be considered. Where manual controls are available for staff use they should be provided with labels clearly defining their function.

7.37 All primary heater batteries and filters should be provided with frost protection.

Controls for special ventilation systems

7.38 The ventilation systems associated with toxic fumes or vapours will usually be required to continue operating for a limited period after work has finished to purge any remaining contaminants. Appropriate over-run timers should be incorporated into their controls. The ventilation systems associated with battery charging may require to be similarly equipped although, in some circumstances, batteries may be left on charge overnight and therefore the associated ventilation system will require to operate continuously. The ventilation systems serving areas where

flammable vapours are generated should, wherever possible, have their controls and associated electrical equipment located outside the hazard zone to avoid or minimise the need for explosion protected enclosure of electrical apparatus.

Ventilation of decontamination area in EME workshop

7.39 Dedicated extract ventilation will usually be integrated with the decontamination cabinet in the EME workshop. The functional performance required is described in Appendix 1. Transfer grilles or other means of supplying make-up air to this space should be sited and arranged to ensure a turbulance-free air supply to the face of the cabinet.

Hot and cold water services

7.40 The domestic hot water supply should be taken from the general hospital calorifier installation at an outflow temperature of 60°C ±2.5°C, and distributed to all outlets so that the return temperature at the calorifier is not less than 50°C.

7.41 Guidance concerning cold water supply pipework and distribution systems is given in HTM27 [17]. For frost protection purposes and to prevent condensation staining decorative finishes, all cold water pipework, valves and flanges should be insulated and vapour sealed.

7.42 To control Legionellae, the water services should be designed, installed and commissioned in accordance with the recommendations in the DHSS Code of Practice [18].

7.43 The hot and cold water supplies to the EME decontamination cabinet (see para 5.17) should be segregated on their own sub-circuit and appropriate arrangements against back syphonage, including a break tank, must be provided.

Industrial compressed air service

7.44 The compressor installation and the compressed air distribution system in maintenance workshops should comply with the general information and advice and the relevant specific safety recommendations contained in the Health and Safety Executive's booklet HS(G)39 [19]. Blow guns with reduced jet velocity safety nozzles are the recommended option for use in maintenance workshops.

Optional Accommodation

Purified water service for renal dialysis equipment workshop

7.45 A purified water supply will be required in the renal dialysis equipment workshop attached to the renal unit. The renal unit is usually equipped with a centralised purified water supply plant and the recirculation loop should be extended to serve the twin outlet in the equipment servicing area (see paragraph 5.48). Renal dialysis equipment manufacturers' data should be consulted for the required water quality and quantities.

Optional Services

Medical Gases

7.46 Medical compressed air is required in the mechanical maintenance/dusty procedures area of the EME workshop and medical compressed air, medical suction, oxygen, nitrous oxide and entonox outlets are required in the anaesthetic equipment workshop. Rather than use portable cylinder supplies and apparatus, it is preferable to have permanent services from the hospital medical gases installations if these are conveniently available nearby thus permitting economic connections to be made. Guidance regarding medical gases installations and terminal outlets is given in HTM 22 [20] and any subsequent published amendments.

7.47 An active anaesthetic gas scavenging system is required in the EME anaesthetic equipment workshop. (See paragraph 5.33).

ELECTRICAL SERVICES

Introduction

7.48 The electrical installations will include main intake switchgear, wiring and equipment for lighting, power, clocks, environmental plant and earth bonding of extraneous metalwork. Extensions from central systems for telephones, fire alarms and staff location/call services will also be required. These installations should comply in all respects with the current IEE Regulations for Electrical Installations [21] and conform to the requirements of HTM7 [22].

7.49 Reference should be made to the Activity Data Sheets for the recommended levels of artificial

illumination, disposition of outlets for power, telephones, and clocks etc in individual spaces.

7.50 The point of entry for the electrical supply will be a departmental switchroom housing the main isolators and the main distribution equipment. The switchroom will also be the distribution centre for subsidiary electrical services and apparatus. All equipment should be mounted at a height to give easy access from a standing position. Switchrooms should be positioned so as to minimise the cost of cabling required to serve the accommodation.

Electrical installations

7.51 The electrical installation in office and circulation areas should be concealed using PVC insulated cable in screwed steel conduit or trunking but, in certain circumstances, mineral insulated copper covered cables may be necessary. External installations should comprise PVC insulated cables in galvanised screwed steel conduit with fittings of weatherproof pattern. Steel conduit and trunking wire ways for communication and data systems should also be concealed in office and circulation areas. Within workshops the electrical installation should usually be surface mounted using PVC insulated cable in screwed steel conduit or trunking but, in certain circumstances, mineral insulated copper covered and PVC sheathed cables may be necessary, (for example to avoid corrosion by chemically agressive atmospheric conditions or to mitigate fire hazards in areas where flammable materials are used or stored).

7.52 The electrical installation in areas where there may be a potentially explosive atmosphere (for example flammable goods stores and areas where flammable solvent or adhesive vapours may be present) should also comply with the Code of Practice contained in the relevant Parts of BS 5345 [23].

Electrical interference

7.53 Guidance concerning the avoidance and abatement of electrical interference is given in HTM14 [24] and fluorescent luminaires (lighting fittings) should comply with BS5394 [25].

7.54 Care should be taken to avoid mains borne interference and electrical radio frequency interference affecting computers and other electronic equipment used in the accommodation described in this Note or elsewhere on a hospital site.

Lighting

7.55 Practical methods of lighting the various functional spaces are contained in the CIBSE Lighting Guide LG2 [26]. The choice of luminaire should take account not only of the requirement of light distribution and visual comfort appropriate to the space, but also the operating efficiency of the light source used. Luminaires should be of types which are easily cleaned and maintained and are manufactured and tested in accordance with the requirements specified in the relevant sections of BS 4533 [27]. Luminaires and associated installation components situated in a potentially explosive atmosphere (eg flammable goods store) should be manufactured and tested in accordance with the requirements specified in the relevant Parts of BS5501 [28], and should be selected in accordance with the recommendations given in the relevant Parts of BS5345 [23].

7.56 Luminaires should be readily accessible for lamp changing and maintenance, but with the overriding requirement that the recommended standard of illuminance is provided to the task areas.

7.57 Luminaires using fluorescent lamps should be installed when artificial lighting is required for long periods or where areas are devoid of natural light. Intermittently used luminaires may be fitted with incandescent or compact fluorescent lamps.

7.58 Control of lighting is normally by local switches and these should be provided in sufficient numbers to allow variation in lighting options, eg reduced levels of illuminance when circumstances permit, and to encourage energy conservation.

7.59 Within the various workshop areas fluorescent lighting should generally be provided and be circuited to avoid stroboscopic effects where rotating machinery is used. Adjustable spot lamps should be provided at benches where close detailed work will be carried out. All–insulated or double-insulated fittings should be selected for these positions.

7.60 The lighting of corridor, stairways and other circulation areas, which generally are areas not covered by Activity Data Sheets, should be in accordance with the guidance contained in HBN 40 'Common Activity Spaces, Volume 2 – Corridors' [29] and Volume 3 – 'Lifts and Stairways' [30].

7.61 In areas where computer terminals are to be used, the lighting should be designed to avoid bright reflections on the screen and to ensure that the contents of the screen are legible. Further guidance can be found in the CIBSE Lighting Guide LG3 [31].

General purpose socket-outlets and power connections

7.62 Sufficient 13 amp switched, shuttered socket-outlets, connected to ring or spur circuits should be provided to allow all portable appliances likely to be used simultaneously to be supplied individually. Activity Data Sheets indicate specific locations for the outlets associated with individual activities; the installation of twin outlets should be considered where the activities are in juxtaposition.

7.63 Depending on local circumstances consideration may need to be given to the quality of the electrical supply at socket-outlets serving computer equipment. It is envisaged that these circuits will be arranged (see also paragraph 7.74) so that regulators, filters or other specialised computer power supply equipment can readily be incorporated either initially or at a later date. The cost allowances do not include for the supply and installation of any such auxiliary equipment

7.64 Domestic cleaning appliances with flexible leads nine metres long should be assumed and switched, single socket-outlets, usually in corridors, should be provided to enable such machines to operate over the whole area of the accommodation.

7.65 Fixed appliances rated up to 13 amps should be permanently connected to double pole switched spur boxes and fused as required. Appliances rated in excess of this load, or those requiring a three-phase supply, should be permanently connected to separate final circuits from fuse-boards and independently switched.

7.66 Local switches or other means of electrical isolation should be provided adjacent to plant and equipment to ensure the safety of operators and maintenance staff.

7.67 Heating appliances and automatically operated equipment should be provided with indicator lights to show when the equipment is energised. Such indicators should be incorporated either in the control panel of the apparatus, in the control switch, or in the outlet from which the apparatus derives its supply.

Socket-outlets in electronic servicing area of EME workshop

7.68 Five of the six twin 13 amp switched, shuttered socket-outlets at each electronic maintenance workstation should be connected via an emergency trip at the workstation to ring circuits supplied from the same phase. These circuits should be protected by a core balance earth leakage protective device having a nominal tripping current not exceeding 15mA and complying with the requirements of BS4293 [32]. In addition, a master emergency trip controlling these circuits should be provided at a suitable position adjacent to the entrance to the electronic servicing area. The remaining twin socket-outlet should be positioned at one end of the workstation and be connected directly to an essential circuit, supplied from the same phase as the other five twin socket-outlets, to permit uninterrupted electrical "soak" testing of repaired equipment. There should be an adjacent prominent notice warning that earth leakage protection is not provided at that particular twin outlet. All socket-outlets at electronic workstations should be mounted in plastic trunking and all metallic fixings should be isolated from earth. A shrouded earth terminal should be provided at one end of each workstation.

7.69 Earth leakage protection, to the same standard described in the previous paragraph, should also be provided for the circuits supplying the socket-outlets positioned on the face of the EME equipment decontamination cabinet and at the work bench in the mechanical servicing/dusty procedures room.

7.70 When an isolated mains supply is required an appropriately rated portable 1:1 isolating transformer should be used, having a flexible lead input and incorporating a 13 amp shuttered socket-outlet suitably fused to protect the transformer. Transformers permanently mounted and wired to fixed socket-outlets are not recommended.

7.71 Similarly, any requirement for adjustable voltage mains supplies should be provided by a portable variable ratio transformer, fitted with a voltmeter and a 13amp shuttered socket-outlet suitably fused to protect the transformer.

7.72 Extra low voltage AC or DC supplies should be obtained from individual portable transformer units or DC power units. The use of secondary cells for DC supplies is not recommended.

Emergency electrical supplies

7.73 Guidance concerning the provision of emergency electricity supplies is given in HTM 11 [33] and the grade of standby lighting provision is shown on the Activity Data A–Sheets. Safety lighting in accordance with HTM 11 [33] and BS 5266 [34] should be provided on primary escape routes.

7.74 All socket-outlets for computer equipment and all communication, clock and alarm systems throughout this accommodation should be connected to the essential electricity supply system.

Staff location system

7.75 The staff location system employed for the hospital should be extended to give cover to this accommodation. Guidance on these systems is given in HTM20 [35].

Telephones

7.76 Central telephone facilities, for internal and external calls, will normally be available and should be extended to serve this accommodation in accordance with the requirements shown on the Activity Data Sheets. Telephones will normally be of desk pattern.

7.77 Guidance concerning the provision of telephone systems and equipment, including the telephone internal cabling distribution and telephone hand sets, is given HBN 48 [36]. A telephone system served by modern electronic exchange equipment should normally meet all internal communication requirements in this accommodation.

Wireways for data links

7.78 Wireways, which should be segregated from electrical power and telephone cabling distribution systems, should be provided for data links between the various WIMS terminals in the works department and also for data links between the engineering systems control and monitoring terminals and the building management computers. There may also be a requirement for data links to other staff work stations elsewhere on the hospital site, depending on the local policy for automatic data processing.

Electric clocks

7.79 A circuit terminating in a fused spur outlet should be provided, in a circulation space near to the entrance to the works department workshops, to supply a time recording clock which will be used by the hourly-paid maintenance staff.

Lightning protection

7.80 Protection against lightning should be provided in accordance with HTM 7 [22], Engineering Data Sheet DB2 [37] and BS 6551 [38].

INTERNAL DRAINAGE

Introduction

7.81 The primary objective is to provide an internal drainage system that uses the minimum of pipework and remains water and air-tight at joints and connections, but is sufficiently ventilated to retain the integrity of water seals.

Design parameters

7.82 General design guidance is given in the relevant British Standards and Codes of Practice including BS 5572 [39], and the current Building Regulations [2]. Recommendations regarding spatial and access requirements for public health engineering services are given in Engineering Data Sheet EA5 [40].

7.83 The gradient of branch drains should be uniform and adequate to convey the maximum discharge to the stack without blockage. Practical considerations such as available angles of bends/junctions and their assembly, as well as space considerations, usually limit the minimum gradient to about 1:50 (20mm/m). For the larger pipes, for example, 100mm diameter, flatter gradients can be used but require workmanship of a high standard if adequate self-cleansing flow is to be maintained. It is envisaged that pipes larger than 100mm diameter will not normally be required within the drainage system serving the accommodation described in this Note.

Operational considerations

7.84 Unusual and difficult maintenance problems can arise because of user interference and abuse. For example, the disposal of paper towels into WCs after hand-washing, or after their misuse for some other purpose, is a frequent cause of blockages particularly in long branches laid to flat gradients. Adequate provision of disposal receptacles or, where appropriate, the installation of warm-air dryers can help to mitigate this problem.

Materials specification

7.85 The materials specified for the drainage system in this accommodation will depend upon their location and the nature of the effluent being discharged. Waste pipework should, as far as practicable, be concealed; where exposed, it should be metallic and very securely fixed. Although adequate for the drainage requirements, UPVC may not always be acceptable to the fire officer and it should not be installed above "sensitive" areas, for example, switchrooms or catering departments.

References

1. **Department of Health and Social Security and Welsh Office.** Investment appraisal in the public sector (HN(82)34). (In Wales, WHC(83)1). DHSS, 1982.

2. **Building Regulations 1985.** (SI 1985 No 1065). HMSO, 1985.

3. **Department of Health and Social Security and Welsh Office.** Access and accommodation for engineering services (Hospital Technical Memorandum 23). HMSO, 1972.

4. **Health and Safety at Work etc Act.** 1974. HMSO.

5. **Consumer Protection Act.** 1987. HMSO.

6. **Department of Health and Social Security and Welsh Office**. Firecode; Fire precautions in new hospitals. (Health Technical Memorandum 81). HMSO, 1987.

7. **Department of Health and Social Security and Welsh Office**. Fire safety in health care premises - Fire alarms and detection systems (Health Technical Memorandum 82). HMSO, 1982.

8. **British Standards Institution**. BS 5839;1980. Fire detection and alarm systems in buildings; Part 1. Code of Practice for installation and servicing.

9. **Department of Health and Social Security and Welsh Office**. Fire safety in health care premises. General fire precautions (Health Technical Memorandum 83). HMSO, 1982.

10. **Ministry of Health**. Noise control. (Hospital Design Note 4). HMSO, 1966.

11. **Department of Health and Social Security**. Health services management - Hospital Design Note 4 (noise control): amendments to appendices II, IV and VII. (HN(76)126). DHSS, 1976. (In Wales, WHN(77)1).

12. **Department of Health and Social Security**. Noise and vibration (DHSS Engineering Data Sheet DH1). DHSS, 1977.

13. **Department of Health and Social Security**. Health building engineering installations: commissioning and associated activities (Health Technical Memorandum 17). HMSO, 1978.

14. **Health and Safety Executive**. Guidance Note EH 40: occupational exposure limits. HMSO (Published and revised annually).

15. **British Standards Institution**. BS 6540: Air filters used in air conditioning and general ventilation. Part I:1985. Methods of test for atmospheric dust spot efficiency and synthetic dust weight arrestance.

16. **The Welding Institute**. Facts about fume. 1976.

17. **Department of Health and Social Security and Welsh Office**. Cold water supply: storage and mains distribution. (Health Technical Memorandum 27). HMSO, 1978.

18. **Department of Health and Social Security and Welsh Office.** The control of Legionellae in health care premises - a code of practice. HMSO, 1988. (Plus subsequent amendments).

19. **Health and Safety Executive**. Compressed air safety. Publication HS(G)39. HMSO, 1990.

20. **Department of Health and Social Security and Welsh Office**. Piped medical gases, medical compressed air and medical vacuum installations. (Health Technical Memorandum 22). HMSO, 1977.

21. **Institution of Electrical Engineers**. Regulations for electrical installations. 15th edition. IEE, 1981. (Plus subsequent amendments.)

22. **Department of Health and Social Security and Welsh Office**. Electrical services: supply and distribution. (Health Technical Memorandum 7). HMSO, 1977.

23. **British Standards Institution**. BS5345. Code of Practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacturer). Published in 8 parts, 1977/1989.

24. **Ministry of Health.** Abatement of electrical interference. (Hospital Technical Memorandum 14). HMSO, 1965.

25. **British Standards Institution**. BS 5394:1988. Specification for radio interference limits and measurements for luminaires using tabular fluorescent lamps and fitted with starters.

26. **Chartered Institution of Building Services Engineers**. Lighting Guide: Hospitals and health care buildings. Publication LG 2, CIBSE. 1989.

27. **British Standards Institution**. BS 4533.Luminaires;

    Part 101: General requirements and tests. HMSO, 1990.

Section 102.55:1986. Specification for luminaires for hospitals and health care buildings. HMSO, 1986.

Section 103.2:1986. Specification for photometric characteristics of luminaires for hospitals and health care buildings. HMSO, 1986.

28. **British Standards Institution**. BS5501: Electrical apparatus for potentially explosive atmospheres. Published in 9 Parts, 1977/1988.

29. **Department of Health and Social Security and Welsh Office.** Common Activity Spaces. Health Building Note 40 – Volume 2 'Corridors'. HMSO, 1986.

30. **Department of Health and Welsh Office.** Common Activity Spaces. Health Building Note 40 – Volume 3 'Lifts and stairways'. HMSO, 1989.

31. **Chartered Institution of Building Services Engineers.** Lighting Guide: Areas for visual display terminals. Publication LG3, CIBSE. 1989.

32. **British Standards Institution**. BS 4293:1983. Specification for residual current-operated circuit-breakers.

33. **Department of Health and Social Security and Welsh Office.** Emergency electrical services. (Hospital Technical Memorandum 11). HMSO, 1974.

34. **British Standards Institution.** BS 5266: Emergency lighting: Part 1: 1975: Code of Practice for emergency lighting of premises.

35. **Ministry of Health.** Staff location systems (Hospital Technical Memorandum 20). HMSO, 1968.

36. **Department of Health and Welsh Office.** Telephone services. Health Building Note 48. HMSO, 1990.

37. **Department of Health and Social Security.** Lightning protection for hospitals. (Hospital Service Engineering Data Sheet DB2). DHSS, 1971.

38. **British Standards Institution.** BS 6651:1985. Code of Practice for protection of structures against lightning.

39. **British Standards Institution.** BS 5572:1978. Code of Practice for sanitary pipework.

40. **Department of Health and Social Security.** Horizontal and vertical drainage - access and accommodation. (Hospital Service Engineering Data Sheet EA5). DHSS, 1978.

8.0 Cost information

Introduction

8.1 For all types of health buildings it is clearly of vital importance that building and running costs should be kept as low as possible consistent with acceptable standards. Within this general context Health Building Notes provide a synopsis of accommodation for health buildings which the Department, in conjunction with the National Health Service, recommends for the provision of a given service.

Works cost

8.2 To prepare an estimate of the works cost for a scheme, reference should be made to the Capricode Health Building Procedures Manual (Chapter 1, Stage 1, Annex 1.c.). The total cost allowance for a scheme is derived by aggregating the cost of the functional units, essential complementary accommodation (ECA) and optional accommodation and services (OAS) as appropriate to the particular scheme.

8.3 The cost allowances cover the building and engineering requirements set out in this Note. In costing the functional units it has been assumed that they will be combined to form a complete department on a hospital site.

Functional units

8.4 The functional units for this Note are:

- **Works department** - 250-349 beds
  - 350-649 beds
  - 650 beds and over
- **External storage** - 250-349 beds
  - 350-649 beds
  - 650 beds and over
- **EME workshop** - 2 electronic workspaces
  - 3 electronic workspaces
  - 4 electronic workspaces
- **Satellite EME workshop**

The activity spaces and areas used for costing the functional units are listed in the Schedules of Accommodation at the end of this Chapter.

Essential complementary accommodation

8.5 This comprises activity spaces which are essential to the running of the department, but which in certain circumstances may be available in a convenient location elsewhere. The amount of essential complementary accommodation (ECA) which will need to be provided as part of an individual project will therefore vary according to the extent of the provision available elsewhere. The ECA costed in this Note is listed in the Schedules of Accommodation at the end of this Chapter.

Optional accommodation and services

8.6 Where appropriate this Note draws attention to alternative ways of providing services or facilities, including the likely cost implications. The information will allow project teams to select the solution which is most suitable to their needs. The optional accommodation and services (OAS) costed in this Note is listed in the Schedules of Accommodation at the end of this Chapter.

Dimensions and areas

8.7 In determining spatial requirements, the essential factor is not the total area provided but the critical dimensions, ie those dimensions critical to the efficient functioning of the activities which are to be carried out. To assist project teams in preparing detailed design solutions for the rooms and spaces, studies have been carried out to establish dimensional requirements in the form of critical dimensions. The results of these studies appear as ergonomic diagrams in Health Building Note 40- 'Common Activity Spaces'.

8.8 For development planning and at the earliest stage of a design it may be convenient for designers to have data available which will enable them to make an approximate assessment of the sizes involved. For this reason the areas prepared for the purpose of establishing the cost allowances are included in the Schedules of Accommodation at the end of this Chapter.

8.9 It is emphasised that the areas published **do not** represent recommended room sizes, nor are they to be regarded in any way as specific individual entitlements.

Circulation

8.10 Space for circulation, which includes allowances for planning provision, engineering zone and partitions, has been added to each functional unit where appropriate and is included in the cost allowances.

Communications

8.11 Staircases, lifts and plant rooms, with the exception of electrical switchrooms, are not included in the cost allowances.

Engineering services

8.12 The following engineering services, as described in Chapter 7 and exemplified in the Activity Data, are included in the cost allowances. Primary engineering services are assumed to be available at the boundaries of the department unless indicated otherwise.

a. Mechanical services

- Heating: Low pressure hot water system, maximum surface temperature generally 82°C.
- Ventilation: Mechanical extract ventilation from welding area of fitters workshop, from adhesives area of joiners workshop and from electric vehicle charging room to meet functional requirements; mechanical ventilation for changing/toilet areas and cleaners rooms; other areas will be mainly naturally ventilated. Woodchip and sawdust collection and extraction system for joiners workshop.
- Cold water service: Centrally supplied to service points, including drinking water and fire hose reels. Storage tanks excluded.
- Hot water service: Centrally supplied to service points. Storage excluded.
- Purified water service: From Renal department central supply plant to service points in renal dialysis equipment workshop.
- Industrial compressed air: from local compressor to service points in works department and EME workshops.
- Medical Gases: from hospital central installations to service points in EME workshop and anaesthetic equipment workshop (OAS); waste anaesthetic gas scavenging in anaesthetic equipment workshop..

b. Electrical services

- Departmental distribution switchboard.
- General lighting as required by tasks.
- Fluorescent, tungsten, safe light and emergency luminaires as appropriate.
- Socket-outlets and other power outlets for fixed and portable equipment, including electrical safety features for workshop testing of EME equipment undergoing repairs.
- Supplementary equipotential earth bonding connections.
- Standby and safety installations from the main hospital supplies.
- Fire alarm system.
- Staff location - extension to the hospital system.
- Telephone internal cabling distribution and outlets. Handsets excluded.
- Data transmission - wireways only.

c. Group 1 Equipment

Works department: Electricians workshop

- Battery charging equipment.
- Pillar drill.
- Degreasing bath.

Works department: Fitters and plumbers workshop

- Lathe.
- Power saw.
- Pillar drill.
- Pipe threading and bending machine.
- Pedestal grinder.
- Degreasing bath.
- Welding booth.
- Air compressor, receiver and manifold.

Works department: Joiners workshop

- Circular saw.
- Planer/thicknesser.
- Morticing machine.
- Bench drill.
- Key cutting machine.
- Woodchip and sawdust collection extraction and system for woodworking machinery.

EME workshop: Mechanical servicing/dusty procedures room

- Lathe.
- Bench drill.
- Pedestal grinder.
- Air compressor, receiver and manifold.

EME workshop: Decontamination area

- EME equipment decontamination cabinet.

Anaesthetic equipment workshop (Optional accommodation)

- Hydraulic press and bench stand.
- Waste anaesthetic gases scavenging (IRD) unit.
- Test panels incorporating medical gases terminals.

Schedules of accommodation for works department

Works department

Para no.	Activity Space	250-349 beds Qty	250-349 beds Total area sq.m.	350-649 beds Qty	350-649 beds Total area sq.m.	650 beds and over Qty	650 beds and over Total area sq.m.
Workshops							
4.2	Electricians	1.0	35.00	1.0	41.50	1.0	54.00
4.11	Fitters & plumbers	1.0	75.00	1.0	90.00	1.0	115.00
4.18	Joiners	1.0	65.00	1.0	71.50	1.0	71.50
4.26	Painters	1.0	24.00	1.0	26.00	1.0	28.00
4.31	Bricklayers & plasterers	1.0	17.50	1.0	17.50	1.0	17.50
Stores							
4.34	Materials & equipment/storekeeper	1.0	80.00	1.0	107.00	1.0	130.00
4.41	Timber & sheet materials	1.0	20.00	1.0	24.00	1.0	24.00
4.43	Emergency equipment	1.0	9.50	1.0	9.50	1.0	9.50
Offices							
4.53a	Unit works manager	1.0	16.00	1.0	16.00	1.0	16.00
4.53b	Building & engineering managers	1.0	27.00	1.0	27.00	1.0	27.00
4.53c	Planner/estimator	1.0	11.00	1.0	11.00	1.0	11.00
4.53d	Technical supervisors	1.0	18.50	1.0	18.50	1.0	18.50
4.53e	Administration/Records	1.0	28.00	1.0	34.50	1.0	34.50
4.53f	Energy Management Systems	1.0	10.00	1.0	10.00	1.0	10.00
Utilities							
4.54	Male staff change/toilets	1.0	25.00	1.0	30.00	1.0	35.00
4.56	Female staff change/toilets	1.0	12.00	1.0	12.00	1.0	12.00
4.58	Mess/rest room	1.0	18.00	1.0	24.00	1.0	30.00
4.60	Cleaner	1.0	6.00	1.0	6.00	1.0	6.00
4.62	Switchroom	1.0	1.00	1.0	1.00	1.0	1.00
	Nett totals		498.50		577.00		650.50
	Circulation etc		119.00		137.50		155.00
	Totals		617.50		714.50		805.50
	Departmental areas		**620.00 sq.m.**		**715.00 sq.m.**		**805.00 sq.m.**

External storage

Para no.	Activity Space	250-349 beds Qty.	250-349 beds Total area sq.m.	350-649 beds Qty.	350-649 beds Total area sq.m.	650 beds & over Qty.	650 beds & over Total area sq.m.
4.45	Access equipment store	1.0	13.00	1.0	13.00	1.0	13.00
4.49	Storage compound	1.0	172.00	1.0	222.00	1.0	272.00
	Nett totals		185.00		235.00		285.00
	Circulation etc		9.00		11.50		14.00
	Totals		194.00		246.50		299.00
	Departmental areas		**195.00 sq.m.**		**245.00 sq.m.**		**300.00 sq.m.**

Essential complementary accommodation

Para no.	Activity Space	Space area sq.m.	Circn etc sq.m.	Total area sq.m.
4.75	Flammable liquids store	8.00	0.50	8.50
4.80	Gas cylinders store	4.00	-	4.00
4.83	Corrosive liquids store	6.00	0.50	6.50

Optional accommodation and services

Grounds and gardens maintenance

Para no.	Activity Space	Space area sq.m.	Circn etc sq.m.	Total area sq.m.
4.64	Supervisor's office	10.00	2.50	12.50
4.65	Mess/changing facilities	12.00	3.00	15.00
4.66	Machinery/equipment store	36.00	2.00	38.00
4.68	Vehicle compound (2 vehicles)	36.00	2.00	38.00
4.69	Greenhouse/potting shed	30.00	1.50	31.50
4.71	Road salt/grit store	20.00	1.00	21.00
4.72	Chemical store	3.00	-	3.00
4.73	Fertiliser store	9.00	0.50	9.50

Miscellaneous spaces

Para no.	Activity Space	Space area sq.m.	Circn etc sq.m.	Total area sq.m.
4.87	Electric vehicle charging room (3 vehicles)	18.00	4.50	22.50
4.91	Garage with hardstanding (1 vehicle)	36.00	2.00	38.00
4.94	Glaziers' workshop/store	15.00	3.50	18.50

Schedules of accomodation for EME Service

EME workshop

Para no.	Activity Space	2 electronic workspaces Qty	2 electronic workspaces Total area sq.m.	3 electronic workspaces Qty	3 electronic workspaces Total area sq.m.	4 electronic workspace Qty	4 electronic workspace Total area sq.m.
5.2	Electronic servicing area	1.0	20.00	1.0	30.00	1.0	40.00
5.9	Mechanical servicing/dusty procedures	1.0	16.00	1.0	16.00	1.0	16.00
5.14	Decontamination area	1.0	9.0	1.0	9.00	1.0	9.00
5.23	Supervising technician's office/secretarial support	1.0	10.00	1.0	10.00	1.0	10.00
5.24	Technical information/records library	1.0	10.00	1.0	10.00	1.0	10.00
5.22	Store	1.0	16.00	1.0	16.00	1.0	16.00
5.25	Staff lockers/handwashing	1.0	2.00	1.0	2.00	1.0	2.00
5.25	Staff WC	1.0	1.50	1.0	1.50	1.0	1.50
5.26	Switchroom	1.0	1.00	1.0	1.00	1.0	1.00
	Nett totals		85.50		95.50		105.50
	Circulation etc		20.00		22.50		25.00
	Totals		105.50		118.00		130.50
	Departmental areas		**105.00 sq.m.**		**120.00 sq.m.**		**130.00 sq.m.**

Satellite EME workshop

para no.	Activity space	Qty.	Total area sq.m.
5.27	Satellite workshop	1.0	21.50
	Nett total		21.50
	Circulation etc		5.00
	Total		26.50
	Departmental areas		**25.00 sq.m.**

EME optional accommodation and services

Anaesthetic equipment workshop

para no.	Activity space	Qty.	Total area sq.m.
5.42	Supervising technician's office	1.0	10.00
5.33	Equipment servicing area	1.0	34.00
	Nett total		44.00
	Circulation etc		10.50
	Total		54.50
	Departmental areas		**55.00 sq.m.**

Audiology equipment workshop

para no.	Activity space	Qty.	Total area sq.m
5.48	Supervising technician's office	1.0	10.00
5.43	Equipment servicing area	1.0	20.00
	Net total		30.00
	Circulation etc		7.00
	Total		37.00
	Departmental areas		**35.00 sq.m.**

Renal dialysis equipment workshop

para no.	Activity space	Qty.	Total area sq.m
5.58	Supervising technician's office /secretarial support	1.0	10.00
5.50	Equipment servicing area	1.0	36.00
5.55	Component store	1.0	16.00
5.56	Home dialysis store	1.0	15.00
5.57	Ready use equipment store	1.0	9.00
5.59	Maintenance/test area	1.0	6.00
	Nett total		92.00
	Circulation etc		21.50
	Total		113.50
	Departmental areas		**115.00 sq.m.**

Miscellaneous spaces

para no.	Activity Space	Space area sq.m.	Circn etc sq.m.	Total area sq.m.
2.33	Trainee EME technician workspace	10.00	2.50	12.50

9.0 Activity Data

General

9.1 "Activity Data" is an information system developed to help project and design teams by defining the users' needs more precisely. This information constitutes the computerised Activity DataBase, first issued to health authorities in England and to the Health Departments in Scotland, Northern Ireland and Wales in 1989, and subsequently up-dated twice yearly. It comprises three types of information sheet: Activity Space Data Sheets (known as A-Sheets), their supporting Activity Unit Data Sheets (known as B-Sheets) and A-Sheet component listings (known as D-Sheets).

9.2 A-Sheets record in more detail than is described in this Note each task or activity that is performed in a particular activity space (which may be a room, space, corridor or bay) together with environmental conditions and the technical data necessary to enable the activities to be performed. Each A-Sheet also contains a list of the titles and code numbers of the relevant B-Sheets.

9.3 B-Sheets provide narrative text and graphics to scale relating to one activity. They show equipment fitted or supplied as part of the building, and the necessary engineering terminals. There are also "component B-Sheets" which show a range of particular components rather than an activity.

9.4 D-Sheets provide information about the total quantities of components (excluding those in Group 4 - see paragraph 1.11) extracted from all the B-Sheets selected for inclusion in an individual A-Sheet.

9.5 Activity Data is only available in the form of magnetic media, but this may be used to generate paper copies where required.

9.6 Further information about the use and preparation of Activity Data can be found in the 'Guide to 'A' and 'B' Activity Data Sheets and their use in health building schemes' issued to health authorities with EL(89) MB/19 (in Wales, WHC(89)18). Health authorities may obtain additional copies of the Guide and an explanatory video tape from the NHS Estate Management and Health Building Agency, Branch NHSE6, Room 540, Euston Tower, 286 Euston Road, London NW1 3DN.

Activity Data applicable to this Note

9.7 A-Sheets recommended for the activity spaces described in this Note are either new sheets, amended ones or selected from existing sheets. A-Sheet code numbers are given at the end of this Chapter.

9.8 Further Activity Data Sheets may be selected, or drawn up by project teams to their own requirements, for any services not described in the Note or included in the list. Members of project teams are advised to contact their Activity Data co-ordinator/Welsh Office for information and advice about the selection of Activity Data, at an early planning stage.

9.9 In order to ensure consistent and economic provision, variations from the A-Sheets recommended for the spaces covered in this Note should be considered only where it has been decided that the function of a space will differ substantially from that described.

Note:

The A-Sheets in the Activity Data may not carry a title identical to that used to describe the activity spaces detailed in this Note. Use of the A-Sheet code number given in the Schedules of Accommodation will, however, result in the correct activity space being accessed in the Activity Data files.

The A-Sheet code numbers given below are those applicable to the middle sizes of accommodation (ie a works department for 350-649 beds and an EME workshop having 3 electronic workstations). For larger or smaller sizes of accommodation the A-Sheets will require amending to suit the specific project requirements.

Activity space	A-sheet code no.	Para no. in HBN
Works department		
Workshops		
Electricians	K0317	4.2
Fitters & Plumbers	K0318	4.11
Joiners	K0319	4.18
Painters	K0320	4.26
Bricklayers & plasterers	K0321	4.31
Stores		
Materials & equipment/storekeeper	W1801	4.34
Timber and sheet materials	W1802	4.41
Emergency equipment	W1804	4.43
Offices		
Unit works manager	M0553	4.53a
Building & engineering managers	M0554	4.53b
Planner/estimator	M0556	4.53c
Technical supervisors	M0555	4.53d
Administration/records	M1031	4.53e
Energy management systems	M0416	4.53f
Utilities		
Male staff change./toilets	V0306	4.54
Female staff change./toilets	V0307	4.56
Mess/rest room	D0211	4.58
Cleaner	Y1213	4.60
Switchroom	K0101	4.62
External Storage		
Access equipment store	W1803	4.45
Storage compound	W1805	4.49
Essential complimentary accommodation		
Flammable liquids store	W1806	4.75
Gas cylinders store	W1807	4.80
Corrosive liquids store	W1808	4.83
Optional accommodation and services		
Grounds and gardens maintenance		
Supervisor's office	M0542	4.64
Mess/changing facilities	V0503	4.65
Machinery/equipment store	W1563	4.66
Vehicle compound (2 vehicles)	K0323	4.68
Greenhouse/potting shed	K0324	4.69
Road salt/grit store	W1564	4.71
Chemical store	W1565	4.72
Fertiliser store	W1566	4.73
Miscellaneous spaces		
Electric vehicle charging room (3 vehicles)	K0111	4.87
Garage with hardstanding (1 vehicle)	K0350	4.91
Glaziers' workshop/store	K0322	4.94

Activity space	A-sheet code no.	Para no. in HBN
EME services		
EME workshop		
Electronic servicing area	K0370	5.2
Mechanical servicing/dusty procedures	K0372	5.9
Decontamination area	K0308	5.14
Supervising technician's office/secretarial support	M0224	5.23
Technical information/records library	H0362	5.24
Store	W1568	5.22
Staff lockers/handwashing	V0602	5.25
Staff WC	V0901	5.25
Switchroom	K0101	5.26
Satellite EME workshop		
Satellite workshop	K0371	5.27
Optional accommodation and services		
Anaesthetic equipment workshop		
Supervising technician's office	M0224	5.42
Equipment servicing area	K0375	5.33
Audiology equipment workshop		
Supervising technician's office	M0224	5.48
Equipment servicing area	K0376	5.43
Renal dialysis equipment workshop		
Supervising technician's office/ secretarial support	M0225	5.58
Equipment servicing area	K0373	5.50
Component store	W1569	5.55
Home dialysis store	W1570	5.56
Ready use equipment store	W1571	5.57
Maintenance test area	K0374	5.59
Miscellaneous spaces		
Trainee EME technician workspace		2.33

Appendix 1

Outline specification for EME decontamination cabinet

1. The decontamination cabinet should be of double skin construction with the inner skin having a smooth hard surface with well rounded corners to permit cleaning. The working surface should be at bench height (approx. 900mm above finished floor level), of stainless steel construction and have a shallow well approx 25mm deep over a working area approx 1200mm long by 650mm wide (front to rear). Its front edge should be lipped over the join between the inner and outer skins to afford protection during loading and unloading of equipment. Its side and rear edges should have approx 50mm upstands which overlap and are sealed to the inner skin.

2. The vertical sliding front viewing and access window of the decontamination cabinet should be counterbalanced and fitted with safety glass. The normal working aperture should be 450mm/500mm high with a maximum access aperture to the working space of at least 700mm high. The bottom edge seal should be suitable to act as a crash buffer and the other edges should also be fitted with seals to permit periodic fumigation of the internal working space.

3. The lower section of the decontamination cabinet should provide storage space for the materials required for decontamination procedures. The upper and lower sections of the cabinet may be demountable for ease of transport and installation. Appropriate provision should be made for joining the two sections and for securing the complete assembly to the floor or wall, unless free standing stability can be assured.

4. Interior lighting of the decontamination cabinet should be by fluorescent lamps positioned above a sealed glass panel in the cabinet's inner roof, with local switching positioned at one side on the cabinet's exterior face. Two 13 amp switched and shuttered socket-outlets should also be mounted at the sides on the cabinet's exterior face at a height convenient for the working aperture. (These outlets should be supplied via an electrical safety circuit - see paragraph 7.69).

5. Hot and cold water outlets, fitted with flexible hoses 1200mm long and adjustable spray/jet nozzles, should be provided at the rear of the working surface in the decontamination cabinet. An industrial compressed air outlet, fitted with a 1200mm long flexible hose and a blow gun having a reduced jet velocity safety nozzle, should similarly be provided in the decontamination cabinet. Controls for these services should be positioned at the front face of the cabinet.

6. The extract fan may be integral with, or adjacent to, the cabinet if the discharge duct is airtight and relatively short (less than 2 - 3m in length) otherwise it should be sited close to the discharge end so that any substantial length of ducting is under negative pressure. The extract fan should be capable of maintaining an air velocity of between 0.5m/s and 0.7m/s measured at a minimum of five points over the working aperture of the cabinet, namely at the geometric centre and at each of the four corners, with the centre of a 100mm dia. vane type anemometer positioned between 50mm and 55mm from the right hand or left hand edge and from the top or bottom.

BIBLIOGRAPHY

Not including detailed engineering references, which are given at the end of Chapter 7.

Acts and Regulations

The Factories Act, 1961. HMSO

The Health and Safety at Work etc Act, 1974. HMSO

The National Health Service and Community Care Act, 1990. HMSO

The Petroleum (Consolidation) Act, 1968. HMSO.

The Highly Flammable Liquid and Liquified Petroleum Gases Regulations, 1972. HMSO

Health Building Notes

(Produced by the Department of Health, Welsh Office and, from September 1990, the Department of Health and Social Services, Northern Ireland.)

13. *Sterilising and disinfecting unit* .(in preparation).

18. *Office accommodation in health buildings,* 1991. HMSO.

44. *Accommodation for ambulance services* (in preparation).

45. *External works for health buildings* (in preparation).

49. *Hospital receipts and distribution centre* (in preparation).

Health Technical Memoranda - Component Data Base

(Produced by the Department of Health and Welsh Office.)

54. *User Manual,* 1989. HMSO.

55. *Windows,* 1989. HMSO.

56. *Partitions,* 1989. HMSO.

57. *Internal glazing,* 1989. HMSO.

58. *Internal doorsets,* 1989. HMSO.

59. *Ironmongery,* 1989. HMSO

60. *Ceilings,* 1989. HMSO.

61. *Flooring,* 1989. HMSO.

62. *Demountable storage system,* 1989. HMSO.

63. *Fitted storage system,* 1989. HMSO.

64. *Sanitary assemblies,* 1989. HMSO.

65. *Signs,* 1984. HMSO.

66. *Cubicle curtain track,* 1989. HMSO.

67. *Laboratory fitting out system* (in preparation)

68. *Ducts and panel assemblies* (in preparation)

69. *Protection* (in preparation)

70. *Fixings* (in preparation)

Firecode

(Produced by the Department of Health and Welsh Office.)

Health Technical Memoranda, numbered:

81. *Fire precautions in new hospitals,* 1987. HMSO.

82. *Alarm and detection systems,* 1989. HMSO.

83. *Fire safety in health care premises: General fire precautions,* 1982. HMSO.

87. *Textiles and furniture,* 1989. HMSO.

Policy and principles, 1987. HMSO.

Directory of fire documents, 1987. HMSO.

Fire Practice Note 2 Storage of flammable liquids, 1987. HMSO.

Nucleus Fire Precautions Recommendations, 1989. HMSO

Health Notices, Circulars, Letters

(Issued by the Department of Health and, where indicated, the Welsh Office.)

Building Legislation Compliance Procedures, HC(88)60/HC(FP)(88)29. (In Wales, WHC(89)20).

Capricode. Health Building Procedures, HN(86)32. (In Wales, WHC(86)62).

Code of Practice for the Storage of Medical, Pathology and Industrial Gas Cylinders, WKO(85)1. (In Wales, CAWO(85)1).

Damage in hospitals - need to buffer movable equipment, DS(Supply) Letter 42/75.

Guide to 'A' and 'B' Activity Data sheets and their use in health building schemes, EL(89)MB/19 (In Wales, WHC(89)18).

Health Equipment Information HE198 *Management of Medical Equipment and Devices,* January 1991. Issued by HMSO. Refer to HN(87)22 (In Wales, WHC(87)41).

Promoting non-smoking on NHS premises, HC(85)22 (In Wales, WHC(85)31).

Removal of Crown Immunity, HN(90)27/LASSL(90)15. In Wales, WHC(91)4).

Safety Action Bulletin No 63. *Decontamination of Medical Equipment and Devices Prior to Investigation, Inspection, Service and Repair*, SAB(90)61.

The Control of Substances Hazardous to Health: Guidance for the Initial Assessment in Hospitals, 1989. HMSO. (Issued with EL(89)MB/185.)

Upgrading and Adaptation of existing buildings. WKO(81)4. (In Wales, AWO(81)8).

Miscellaneous publications

Code of Practice for Design of Buildings, 1980. BS 5925.

Health and Safety Executive. *Storage of Highly Flammable Liquids,* Guidance Note CS2, 1977. HMSO.

Health and Safety Executive. *Keeping of Liquified Petroleum Gases in cylinders and similar containers,* Guidance Note CS4, 1986. HMSO.

Health and Safety Executive. *Storage of Liquified Petroleum Gases at fixed installations,* Guidance Note CS5, 1981. HMSO.

Works Guidance Index, Published annually. DH.

Alphabetical index

Access equipment store 4.43

Accommodation in a Works department 3.9

Activity Data 7.13, Chapter 9

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- Engineering plant and services maintenance
- Electronic and medical engineering equipment maintenance
- Ground and gardens maintenance
- Engineering services operation

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